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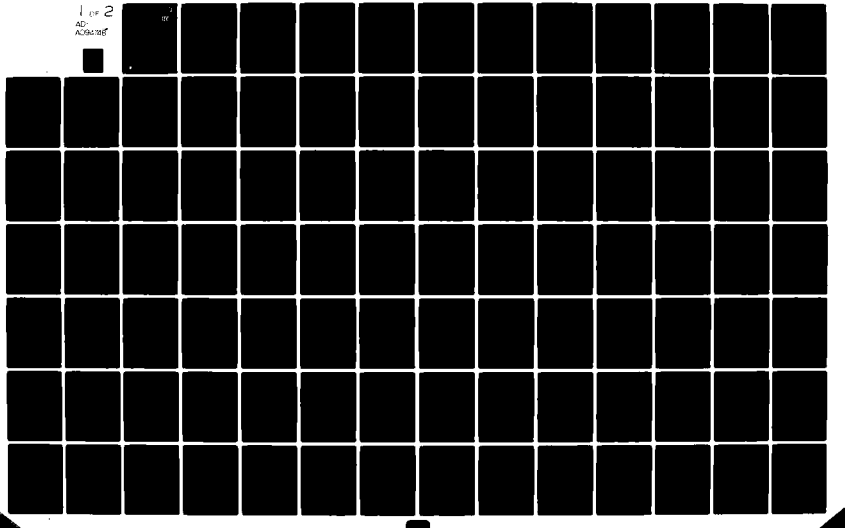

(12)

Final Report

EOC REQUIREMENTS AT STATE AND LOCAL LEVELS

LEVEL II

Prepared for

Federal Emergency Management Agency
Washington, D.C. 20472

Contract: DCPA01-77-C-0231
Work Unit 2614B

August 1980

Center for Planning and Research, Inc.

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By:

Kent F. Paxton
Frederick Goshe
Charles T. Rainey

August 1980

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Emergency Operating Center functions and requirements at local, area, sub-State, and State levels are analyzed. EOC roles in times of normalcy, in natural disasters with and without warning, and in the crisis, in-shelter, and postattack phases of nuclear war are examined and compared. Three approaches to a backbone nationwide direction and control network are reviewed. A sub-State system based on existing State Highway department districts is proposed and correlations with other backbone concepts evaluated. In a companion manual, a guide to

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developing an EOC standard operating procedure is presented, based on the foregoing EOC requirements analysis. The manual includes a sample EOC Standard Operating Procedure for a county.

DETACHABLE SUMMARY

EOC Requirements at State and Local Levels

Kent F. Paxton, Frederick Goshe, and Charles T. Rainey
Center for Planning and Research, Inc.
Contract No. DCPA01-77-C-0231

The major objective of this research effort was to evaluate the flexible use of Emergency Operating Centers (EOCs) in natural disasters and in nuclear civil protection (NCP) operations. Analysis was focused on three direction and control levels: the zone (a municipality or other Minor Census Divison), the area (a county or large city), and the region (sub-State or State).

To determine EOC facility, equipment, and personnel requirements, direction and control functional roles at each level and in five major contingencies were identified. A distinction between disasters occurring without warning and those occurring with warning was drawn because of the differing direction and control roles in each case. In the NCP phases, the crisis period required consideration of 'two-track' direction and control roles in risk areas: community shelter planning (CSP) and crisis relocation planning (CRP). The direction and control roles that an EOC must be designed, equipped, and staffed to serve are shown in Exhibits S-1 and S-2.

With the basic direction and control roles in each contingency and at each level thus defined, EOC location, protection, equipment, and personnel requirements were addressed. An ideal EOC will be in or near the governmental administrative center; remote from risk, natural hazard, and congested areas; near the geographic and population centroid of the area served; provided with good access, egress, and security; and in a well-constructed building with potential space for EOC expansion in the crisis period.

Protection considerations include fallout, direct effects, and earthquake-, flood-, tornado- and wind-resistant construction standards for the building in which the EOC is situated. At the area and region levels, alternate EOCs—and the ability to relocate to them quickly—become increasingly important. Because direction and control roles cannot be performed at area and region levels without communications, protection against electromagnetic pulse is necessary. Communications can also be protected by insuring availability of replacement parts for fragile elements of the system, such as antennas.

A primary direction and control function at all levels and in all contingencies is the collection and analysis of information. Data and display needs were identified in this report and a number of charts and other display media were suggested.

Exhibit S-1

DISASTER DIRECTION AND CONTROL FUNCTIONS

	DISASTER WITHOUT WARNING	DISASTER WITH WARNING
Region	Assess Damage Broker Mutual Aid Between Areas Coordinate State Agency Response Furnish Special Resources	← Plus: Coordinate Federal and State Mitigation Efforts Monitor Environment Maintain Liaison With NWS,USGS
Area	Assess Damage Respond to Area Problems Set Priorities for Area Response Coordinate Mutual Aid Zone-to-Zone Area-to-Area Federal and State to Area and Zone	← Plus: Inform Public Assist in Evacuation Assist in Mitigation Monitor Environment
Zone	Assess Damage Set Response Priorities Coordinate Mutual Aid	← Plus: Warn the Public Control Evacuation Mitigate Effects Increase Readiness

Exhibit S-2

NCP DIRECTION AND CONTROL FUNCTIONS

	CRISIS			IN-SHELTER	POSTATTACK
	Early	Deepening	Mobilization		
REGION	Prepare EPI Train Region Staff Adjust Plans & Allocations Prepare EOC	Provide Info to Media Monitor Spontaneous Relocation Coordinate State Aid Prepare for Relocation	Monitor Movement Adjust Allocations Assist in Shelter Upgrading Test Commo	Assess Damage & Fallout Assist in Remedial Movement Reestablish Commo Revise Recovery Plans Prepare Public Info	Restore Commo Assess Damages & Resources Set Goals, Policies, Priorities Control Resources
AREA	Provide Public Information Review Plans Conduct Training & Exercises Liaison with Industry Protect Assets	Insure Traffic Control Monitor Spontaneous Relocation Set Priorities for State Aid Test Warning	Control Movement Protect Equipment Inform Public	Assess Damage & Fallout Conduct Emergency Operations Keep Region Informed	Restore Commo Assess Damages & Resources Restore Basic Services Clear Debris
ZONE	Improve Plans Increase Public Information Train Emergency Services & Public Conduct Exercises Upgrade Shelter Test Warning	Increase Public Info Monitor Spontaneous Relocation Continue Readiness Activities	Upgrade Shelter Stock EOC & Shelters Continue Training & Tests Start Relocation Commute Essential Workers	Monitor Environment Direct Emergency Response Assess Damage & Fallout Check Other Zones Sustain Population Review Postattack Plans	Assess Damage Sustain or Move Fight Fires Monitor Environment Report to Area Clear Debris Restore Utilities

Staffing requirements vary substantially with the hierarchic level of the EOC and with the nature of the contingency. A basic complement is presented and special requirements are identified in the discussion of each contingency.

A second major objective of the research was to explore and define a feasible 'backbone' direction and control system for the mid-1980s threat environment. Parallel studies were evaluated and a concept was developed based on State highway department facilities. These facilities are generally well-dispersed, include engineering equipment and manpower, are tied to Statewide communications nets, and are capable of rapid enhancement. These facilities meet most of the desiderata outlined in the Harker and Wilmore report, A Study of Crisis Relocation Management Concepts Derived from Analysis of Host Area Functions and Policy Decisions.* The State highway department approach is also basically compatible with communications requirements and the 'hermit crab' concept developed in the DCPA concept paper on a national backbone direction and control system.**

Phase II of the project resulted in the preparation of an EOC procedure manual "aimed at standardization of EOC functions, features, procedures and resources for flexible and expanded use in various contingencies." The results of the Phase II effort are presented in a separate volume in the form of a prototype manual for developing EOC operating procedures. In developing this manual, information regarding the potential role of EOCs during a crisis was drawn from a companion project completed earlier on crisis relocation planning exercises. Other information on EOC functions, characteristics and staffing, and operations presented in the manual is largely a synthesis of experience, guidance, and previous research. Because of the wide variety of source materials, it is not possible to attribute specific parts of the manual to specific authors; nevertheless, their contributions are recognized.

* R. A. Harker and A. E. Wilmore, A Study of Crisis Relocation Management Concepts Derived from Analysis of Host Area Functions and Policy Decisions, Interim Phase I Draft Report, SYSTAN, Inc., Los Altos, California (May 1978) (Contract No. DCPA01-77-C-0235).

** Defense Civil Preparedness Agency, National Backbone System of Facilities for State and Local Government Direction and Control of Emergency Operations—A Concept Paper, Review Draft (December 1978).

ABSTRACT

Part One of this report analyzes Emergency Operating Center functions and requirements at local, area, and sub-State or State levels. EOC roles in times of normalcy, in natural disasters with and without warning, and in the crisis, in-shelter, and postattack phases of nuclear war are examined and compared.

In Part Two, three approaches to a 'backbone' nationwide direction and control network are reviewed. A sub-State system based on existing State highway department districts, facilities, and equipment is proposed and correlations with two other sub-State concepts (MIDAS and RAOC) are evaluated.

CONTENTS

CONTENTS (Continued)

CONTENTS (continued)

LIST OF EXHIBITS

I. INTRODUCTION

Background

A central component of effective emergency management during preparedness, response, and recovery phases of international crises, natural disasters, technological accidents, and other emergencies is the ability of emergency management personnel at all levels of government to rapidly assess, evaluate, and respond to emergency-generated problems. The value of a core facility from this emergency evaluation and reaction can be coordinated and directed is well established.

Since the enactment of the Federal Civil Defense Act in 1950, federally funded Emergency Operating Centers have been constructed at local, county, state, and federal levels to provide a base from which emergency operations can be conducted. The distribution of these facilities has been uneven, however, both among the nation's regions and among the four main levels of government. Size, configuration, and capability of individual federally funded EOCs also vary considerably. These distribution and non-standardization problems have been caused by many factors: the saliency or non-saliency of civil defense in a given community (EOC construction is a local option and requires local initiative to be undertaken), the willingness and ability of jurisdictions to fund half of the construction costs and most recurring maintenance costs, shifting federal priorities on EOC construction, and the lack of consensus on what an EOC does and what is required to do it.

Scope

This project has been conducted under Defense Civil Preparedness Agency (now Federal Emergency Management Agency) Contract Number DCPA-01-77-C-0231 by the Center for Planning and Research, Inc. (CPR). It was initially undertaken to investigate commonalities and conflicts between EOCs as Nuclear Civil Protection crisis centers and EOCs as non-NCP emergency management centers, and to produce an EOC procedure manual for training and operational use.

The initial statement of work for Phase I required CPR to:

(a) Investigate the locale, equipment, furnishings, personnel and procedures of EOCs at the various government levels in order to establish what lends itself readily to the conduct and direction of crisis relocation operations and what

supplementary assets would be required to convert such EOC into a dual-use facility for Community Shelter Planning (CSP) and Crisis Relocation Planning (CRP) or overall Nuclear Civil Protection Planning (NCP). Study EOC procedures with the objective of modifying existing ones and adapting them to the operational requirements of crisis relocation, and establish the mode in which the best interface is attained with other operational elements participating in the relocation measure. This will apply to higher, collateral and lower levels as the case may be and to non-governmental agencies as well.

(b) Assemble these procedures into an exercise design and test them in cooperation with DCPA to validate hypothesis and assumptions made. In no case should the modification of permanent assets and procedures deprive the EOC's of their capability and utility to direct and control operations in day-to-day or non-relocation crisis activities.

(c) Prepare a prototype procedural manual for use by EOC staff describing layouts, personnel organization, canned messages or scenarios and type forms for such, and routine as well as emergency procedures.

In Phase II, CPR was to:

(a) Test the procedure manual by exercises carried out in locations and at levels to be chosen by DCPA and incorporate in it modifications resulting from these tests that will further improve EOC capabilities.

(b) Explore EOC's at various levels for the most desirable features and revise the prototype manual with the aim of maximum feasible standardization of all EOC features, procedures, and resources that contribute to its optimum utilization in a multi-purpose mode. Such an EOC manual should be suitable for use in training EOC staffs as well as serving as operational manual for EOC crews.

Project objectives were considerably modified as events and decisions at the national level gradually shifted the focus and priorities of civil defense efforts during the contract period. In particular, a report by System Planning Corporation in March 1978 (Candidate US Civil Defense Programs) led to a series of administrative and legislative discussions and eventual consensus that civil defense objectives in the United States can best be met through program option D', one of the relocation alternatives put forward in Candidate US Civil Defense Programs.

The emergence of D' as the preferred alternative civil defense policy was reflected in a modification of tasks in both Phase I and Phase II. Tasks (b) and (c) of Phase I were revised as follows:

"(b) Explore EOC's at various levels for the most desirable features and define a feasible system for Civil Defense direction and control that would be survivable in the attack threat environment anticipated for the mid-1980s, and that would also be based on full Federal funding for facilities and minimum equipment requirement. Such system shall be designed for direction and control operations with population either evacuated or in place, in crisis and attack situations and also in peacetime disasters.

(c) Assist in the preparation of an exercise design and input documentation for the test of hypothesis and assumption made. Participate, as necessary in such tests in cooperation with DCPA."

The scope of work to be accomplished in Phase II of the project was also changed. Task (b) was eliminated and Task (a) was modified to require CPR to:

"(a) Evaluate exercise results from a companion project and incorporate these pertinent and applicable results into a procedural manual aimed at standardizations of EOC functions, features, procedures and resources for flexibile and expended use in various contingencies, including the CSP and CRP modes. Such EOC manual or manuals shall describe preferred layouts, personnel organizations, communications and directions and control procedures and shall be suitable for training EOC staffs as well as for operational use at the various levels of government."

The results of the Phase II effort are presented separately in the form of a prototype manual for developing EOC operating procedures. In developing this manual, information regarding the potential role of EOCs during a crisis was drawn from a companion project completed earlier on crisis relocation planning exercises. Other information on EOC functions, characteristics and staffing, and operations presented in the manual is largely a synthesis of experience, guidance, and previous research. Because of the wide variety of source materials, it is not possible to attribute specific parts of the manual to specific authors; nevertheless, their contributions are recognized.

Method of Approach

In Chapters II through VI, six operating situations are discussed and analyzed from three basic perspectives—zone, area, and region. The situations range from the direction and control role during times of "normalcy", direction and control activities in a peacetime disaster without warning, direction and control response in a peacetime disaster with warning, and direction and control actions in the crisis phase, the in-shelter phase, and the postattack phase of a nuclear emergency. In each situation, the characteristics of the emergency environment, the direction and control roles, and the supporting EOC physical and staffing requirements are investigated. The analysis considers location factors; space, equipment, and furniture needs; data and display requirements; communications and protection essentials; and staffing levels.

A distinction is made between peacetime disasters that occur without warning and disasters that occur with warning. In the first case, direction and control activities will be primarily reactive, focusing on damage assessment, setting of priorities, and coordination of local and mutual aid resources. Disasters that typically occur without warning include:

- o Earthquake
- o Fire
- o Flash Flood
- o Hazardous Materials Incident
- o Transportation Accident
- o Terrorist Incident

Disasters preceded by some warning period require a proactive response, with emphasis on warning, public information, short-term mitigation, and alerting of emergency services and potential mutual aid providers. Such disasters include:

- o Civil Disorder/Riot*
- o Epidemic
- o Pollution Episode
- o Resource Shortage
- o Flood
- o Tsunami
- o Tornado
- o Storm/Hurricane
- o Landslide*
- o Volcanic Eruption
- o Predicted Earthquake
- o Dam Failure*

The starred (*) disasters can also occur without warning.

In the crisis period, roles of risk area and host area direction and control elements are differentiated. In general, risk area EOCs that remain operational will concentrate on maintaining security and essential services and production; host area EOCs will be concerned with management of services to the relocated population.

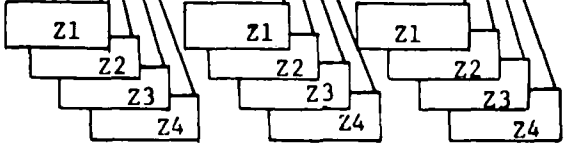
During the in-shelter period, direction and control activities will be driven by the basic operating situation in the zone: whether the mix of damage, fires, and fallout permits maintaining the in-shelter posture, requires remedial movement, or allows firefighting and rescue activities.

In the postattack period, direction and control activities depend not only on the damage, fire, and fallout situation, but also on the availability and accessibility of resources to sustain population.

Direction and control roles and actions will hinge not only on the imperatives of the situation, but also on the hierarchical level of the particular direction and control element. The lower the level, the more operationally oriented the direction and control role will be. Conversely, higher levels will be more involved in situation assessment, coordination of response and mutual aid, and allocation of critical resources. In this report, three sub-Federal levels are identified and direction and control functions examined: zones, areas, and regions (Exhibit I-1). For analytical purposes, these levels will be discussed in geographic rather than jurisdictional terms, although it is recognized

Exhibit I-1

DIRECTION AND CONTROL LEVELS

Jurisdictional Level	Direction and Control Nodes	Primary Functions	No. of Units
Region (Sub-State or State)		Resource Allocation; Recovery Management	?
Area (County)		Coordination of Support; Gathering and Compilation of Information	3,044
Zone (MCD)		Operational Control of Response Elements	35,000

that direction and control elements are most effective when they are associated with existing governmental structures and reflect day-to-day authority and responsibility relationships.

Zones

Zones are the lowest level at which significant direction and control activities occur. A zone is a relatively small geographic area, equivalent to the Minor Census Division (MCD) designation of the Bureau of the Census. There are 35,000 MCDs currently in the United States. 20,000 are cities and 15,000 are classified as "other". A zone may be a township or municipality and surrounding territory, or it may be a ward, district, precinct, or other subdivision of a large city (see Exhibit I-2). It is at this level that immediate actions to protect lives and property will be taken.

Areas

Areas include a number of zones and coordinate inter-zone activities and support. Areas correspond to counties (called boroughs in Alaska and parishes in Louisiana); there are 3,044 such entities in the United States. Area direction and control elements collect and pass situation information from zones to State and sub-State levels; coordinate mutual aid activities between zones and from State, Federal, and private agencies to zones; and provide support to zones from their own resource base.

Regions

Regions are sub-State or State level entities and are the least well defined of the levels discussed in this report. Part Two examines alternative organizational arrangements for this multi-county level; for the purposes of the analysis in Part One, however, it is simply assumed that there is some direction and control layer above the county.

In summary, to determine direction and control requirements for the various peacetime and nuclear emergency contingencies that may arise, and the extent to

EXHIBIT I-2

POLITICAL SUBDIVISIONS OF THE FIFTY STATES*

- County - The major geographical unit within states (Alaska's counties are officially called "boroughs," and Louisiana's, "parishes").
- Municipality - A political subdivision operated by municipal corporation to provide local government within specified boundaries.
- Township - Governmental units officially called: "towns" in the New England states, New York, and Wisconsin; "plantations" in Maine; "locations" in New Hampshire; and "townships" in 13 other states.
- School District - Types of governmental units that provide for the administration and operation of public schools. The number of school districts has declined markedly over the past 30 years, primarily because of consolidation.
- Special District - An area authorized by legislation to provide several types of services (fire protection, water supply, etc.) and known by various titles such as district, authority, board, or commission.

Note: Municipalities and townships are considered "Minor Census Divisions" by the Bureau of Census.

Statistics from 1972 Census of Governments*

Subdivision	Number	Approx. Population Served	%of Total U.S. Pop.
County	3,044	180 million	88%
Municipality	18,517	132 million	65%
Township	16,991	46 million	23%
School District	15,781	n.a.	
Special District	23,885	n.a.	

*Adapted from Appendix J, CPR report, Crisis Relocation in the Mid-1980s (in preparation).

which current Emergency Operating Center procedures and systems are compatible for peacetime and NCP operations, we first look at the roles that the direction and control elements at various levels play, and then construct an ideal EOC with equipment, staff, and procedures to support the functions identified.

PART ONE—DIRECTION AND CONTROL NEEDS

II. NORMALCY

III. DISASTER WITHOUT WARNING

IV. DISASTER WITH WARNING

V. CRISIS

VI. IN-SHELTER

VII. ANALYSIS AND ISSUES

II. NORMALCY

Zone Level

Environment

In the day-to-day affairs of government, emergency preparedness activities can fairly be characterized as generally having low priority and low visibility. At the zone level, increasing competition for scarce financial and personnel resources will affect the extent to which the direction and control functions and roles of the zone emergency organization can be carried out.

Direction and Control Functions

The primary purpose of the direction and control element in times of "normalcy" is to develop the readiness and capability of the emergency organization to effectively respond to the range of situations described in Chapters III through VII—from disasters that occur without warning through the postattack phase of a nuclear confrontation.

Readiness and capability as used in this context are distinguishable. Readiness refers to the ability of the emergency staff to execute the plans it has designed and is developed by hiring adequate civil defense staffs, preparing plans, training those with emergency responsibilities, and conducting regular emergency exercises. Capability as used here refers to the "hardware" necessary to execute plans, including EOCs and EOC systems, vehicles and heavy equipment, and stocks of necessary emergency supplies. Readiness is relatively inexpensive to develop; capability to a large degree will depend on the size of the jurisdiction and its attitudes toward preparedness, and especially on the availability of State and Federal financial assistance.

To develop readiness and capability, the functions of the direction and control staff during this period will include planning, training, exercising, and identification of community public and private resources, both human and material.

Plans should be written, revised, distributed, and tested during the normalcy

period. They should cover the full range of emergencies that could reasonably be expected to occur in the zone. The listing in Exhibit II-1 suggests the scope of plans that a well-organized zone will produce.

Once plans are written, emergency service personnel should be made familiar with them through the medium of training sessions and simulation exercises. Some plans may be tested with field exercises, where emergency equipment and personnel are actually moved and volunteers are used to simulate casualties. The field exercise is an appropriate device for testing a multicasualty incident plan or plane crash plan, for instance. Other plans, designed for response to major widespread disasters, will lend themselves more to testing by means of table-top or operations exercises. Nuclear civil protection plans fall into this category. Such exercises provide a way to test not only staff and plans, but also the EOC and other emergency systems and equipment.

A final and related function of the direction and control element during this period is the accumulation of data on human resources (volunteer groups, auxiliaries); equipment sources (emergency power, water, and engineering materials); and supplies (food, bedding, medical, and sanitation). Subsequent chapters detail the data requirements of the direction and control element during each contingency; this information needs to be collected and organized during quiet times if it is to be available and usable in emergencies.

EOC Physical Requisites

Location. The location of the direction and control staff during the preparedness period will be influenced by the location of the seat of government. If an EOC exists in the zone, the direction and control staff should be located in or near it. To perform its planning, testing, and resource compilation roles, it should be sited at the seat of government, close to the administrative and departmental offices that provide the manpower and resources of the emergency organization.

Data and Display Requirements. These requirements to support the

planning and training functions will include a tracking chart of emergency-plan element assignments and due dates. An example is shown in Exhibit II-1. Training and exercising schedules also lend themselves to chart presentation. A map of the jurisdiction should be available which indicates locations of principal roads, buildings, and critical facilities. Dam inundation and flood zone maps, and other such hazard-information display devices are also needed for effective planning. A list of EOC representatives, with day and night telephone numbers, should also be posted in the civil defense office and EOC.

During the preparedness period, the direction and control element should devote considerable effort to compiling and organizing resource information that will be required in time of emergency. Subsequent chapters deal more fully with the kinds of data needed in various contingencies. Display systems and needs in peacetime and nuclear disasters are also detailed in Chapters III through VII.

Space and Furniture Requirements. These requirements for the preparedness tasks of the direction and control element are modest: adequate office space and furniture in or near the EOC for the staff to prepare plans, and storage areas for EOC systems and supplies. The civil defense office should have access to training rooms and equipment as well.

Equipment and Supplies Requirements. Equipment and supplies are those required for any administrative office, and should include typewriters and copying machines, preferably mobile ones that can be quickly relocated to the EOC.

Communications Requirements. These requirements for the direction and control element during the normalcy period will be met by telephones and standard postal service. It is important, however, that emergency communications systems described in subsequent chapters be tested frequently to insure that they function properly and that staff members are familiar with their operation.

Protection Requirements. The protection requirements are minimal in this period. The major consideration will be security for the EOC and its systems;

Exhibit II-1

STATUS OF PLANS

PLAN ELEMENT	DATE CURRENT ELEMENT APPROVED	REVISION DUE	ASSIGNED TO	SUBMITTED FOR REVIEW	APPROVED		
					By	On	Via
Basic Plan							
Annexes							
Direction & Control							
Warning							
Communications							
RADEF							
Public Information							
Police							
Fire							
Public Works							
Health/Medical							
Shelter/Welfare							
Schools							
Transportation							
Contingency Plans							
Earthquake							
Tornado							
Hurricane							
Flood							
Hazardous Materials							
Multi-Casualty Incident							
NCP Plans							
Basic							
Increased Readiness							
In-Place							
Crisis Relocation							
Resource Manual							

location in a government building will make security easier to provide.

Staffing

Staff requirements for the civil defense office of a jurisdiction are outlined in Reference 1, Standards for Local Civil Preparedness. The box below reproduces suggested ranges of civil preparedness staffs in jurisdictions of varying sizes.

Approximate Population	Equivalent Full-Time Professional Positions
Over, 1,000,000	15 to 40
500,000 to 1,000,000	6 to 15
250,000 to 500,000	4 to 6
100,000 to 250,000	3 to 5
50,000 to 100,000	2 to 3
25,000 to 50,000	1-1/2 to 2
15,000 to 25,000	1 to 1-1/2
5,000 to 15,000	1/2 to 1
1,000 to 5,000	1/2
Under 1,000	1/4

The population of a zone may range up to 100,000; its preparedness staff therefore would range from a quarter-time person to two or three persons. It should be noted that these standards are variable, depending on organizational structure and the tasks assigned to the agency, and are meant to indicate minimal levels of staffing. The planning, training, and resource compilation functions of the direction and control element at the zone level will probably require more manpower if effective levels of preparedness are to be maintained.

Area Level

Environment

At the area level, more human and financial resources are typically available to meet concomitantly larger responsibilities. The area must plan for response to

problems in its own jurisdictional sphere, as well as coordinate the planning efforts of the zones within its boundaries. If zones are small and unable to fund adequate preparedness programs and services, the burden on the area jurisdiction will be substantially greater than if zones are self-sufficient and willing to develop their own emergency capabilities.

Direction and Control Functions

Like zones, areas during the preparedness period must concern themselves with planning, training, and resource compilation. In addition, the direction and control element must insure that zone plans are consistent and integrated with the area plan. If zones are unable to provide adequate training, the area direction and control element should provide areawide training and exercising services. If zones do conduct training and exercises, the area direction and control staff has the obligation to insure that training efforts, like the plans they are designed to test, are mutually supporting and coordinated.

Regarding resource compilation, the area direction and control element, besides preparing its own resource manuals and files, should insure that information developed at the zone level is shared with other zones and included in the area resource compendium.

Another functional responsibility of the area during periods of normalcy is to develop mutual aid structures and systems so that when emergencies occur, zones are capable of assisting each other and the coordinating role of the area is understood and accepted.

Finally, the area direction and control element has primary responsibility for insuring that communications systems linking zones with each other and the area are maintained and tested.

EOC Physical Requisites

Location. The location of an area direction and control node ideally will

be located at the jurisdictional administrative headquarters and close to the geographic and population centroid of the area. This location will permit effective communications and facilitate travel to meetings, training, and exercises conducted by the area.

Data and Display Requirements. These requirements for the area direction and control staff will include the status and schedule charts mentioned in the preceding section, as well as facility and hazard maps necessary to perform the planning function. Data and display requirements for the various emergencies that may occur should be developed during the preparedness period and be available at the EOC; subsequent chapters review these requirements specifically in terms of the various emergency situations.

Space and Furniture Requirements. These requirements at the area EOC will be proportionately larger than at the zone level. If one of the zones includes the area seat of government, EOC space and facilities can be shared, thus reducing costs and eliminating one communications link.

Equipment and Supply Requirements. Equipment and supplies for the direction and control element at the area level include the standard set of office machinery—typewriters, copying machines, and calculators—and basic stocks of paper products and expendables. The area should also have on hand in or near the EOC a supply of the message forms to be used in emergency operations and any other printed materials needed for emergency response and coordination, such as damage assessment work forms, emergency proclamations, boilerplate public information advisories, or other analytical or computational aids.

Communications Requirements. Communications during the normalcy period will be by phone and mail primarily, but it is especially important for the area level direction and control element to maintain and exercise emergency radio and other communications systems to insure that the equipment and its operators are both prepared to function in an emergency. Radio amateur and citizens band groups should be

encouraged to work closely with the civil preparedness office, and to exercise their equipment and procedures on a regular basis.

Links with the National Warning System (NAWAS) and the Emergency Broadcast System (EBS) should be established at the area EOC during this period, and procedures for the use of these systems included in the training program. Procedures should also be developed for receiving information from zones for broadcast over EBS, and for passing on NAWAS-originated information and warnings to zones.

Protection Requirements. These requirements for the area direction and control element during the preparedness period are minimal; security for the EOC and its systems is the primary requisite.

Staffing

Area level jurisdictions will typically be in the middle ranges of the scale shown on page 14; a staff of 4 to 15 full-time professionals, depending on the size of the jurisdiction, will meet minimal requirements for direction and control planning activities during the normalcy period. Area manpower requirements should also be considered in the context of the level of effort in subordinate zones; if zones have small staffs, the area personnel requirement will be correspondingly higher.

Region Level

Environment

Regional level direction and control elements do not exist in many States; where they do exist, they are usually part of the State civil preparedness agency. Regional direction and control staffs are typically composed of coordinators from a number of different State agencies which are widely dispersed geographically.

Direction and Control Functions

Where regional civil preparedness direction and control staffs exist, their functions during the normalcy period include developing regional plans, coordinating (and in some cases reviewing and approving) area level plans, developing mutual aid systems and

procedures, maintaining inventories of regionwide resources (both public and private), and structuring and organizing regionwide training and exercising programs.

EOC Physical Requisites

The direction and control roles described for the regional level organization above probably do not justify a standby EOC at this level for disaster situations. The wide dispersion of regional staff creates substantial difficulties in assembling personnel and activating an EOC for all but the most major disasters. Where States have already organized a sub-State system and constructed or designated an EOC facility, the region can play an important role in coordinating multi-area disaster response. Nevertheless, the real need for a regional level EOC first emerges in the crisis phase of a nuclear emergency, and therefore EOC requisities for the regional level will be discussed in Chapter V and subsequent sections of this report.

III. DISASTER WITHOUT WARNING

Zone Level

Environment

Disasters that strike a community without warning demand rapid evaluation of the hazard and the effects, establishment of priorities, and effective coordination of public and private response agencies involved in mitigating its effects. Unlike the emergencies discussed in subsequent chapters of this report, a disaster without warning allows no time for increasing readiness of emergency services, alerting the public to the dangers and to ways of avoiding them, or refining plans to cope with the situation. Whatever capabilities and resources have been developed during the normalcy period are all that are available during the early stages of such disasters. The extent to which mutual aid from other zones or areas has been preplanned, exercised, and institutionalized will in large part determine whether outside forces can be brought to bear effectively during the emergency period.

Direction and Control Functions

The first and most critical role of the direction and control element in responding to a disaster without warning is to determine the nature and extent of the disaster. Initially, reports will be fragmentary; it is very common for communications systems to fail or degrade under the pressures of a major event such as an earthquake, flash flood, etc. Telephone service may be knocked out or dial tones may be absent because of system overload. Radio communications may be disrupted by damage to transmitters or antennas, or degraded through frequency crowding.

Beyond destruction or overload of communications systems, information itself is frequently difficult to gather. Fire, police, and medical vehicles may find it difficult to get to the scene or scenes of major problems because of disaster-caused damage, fires, or contamination. A common problem is that those at the scene of a major

incident are concentrating on rescue and relief activities and often overlook reporting the problem to authorities. In the 1971 Los Angeles earthquake, the major scene of destruction and loss of human life was the Veterans Hospital in San Fernando, where a building collapsed. This was the last major event reported to emergency centers, because people at the scene were left without radio or telephone communication and immediately began self-help rescue activities without sending someone to spread word of the need for assistance.

This information-gathering function is one of the main justifications for a centralized direction and control node--the emergency operating center. If all emergency forces have only a partial picture of the overall situation, it is sensible to pool that information at a central point so that problems can be evaluated and ranked, response planned and coordinated, and "dead spots"--those areas from which no reports have been received--can be investigated. Police will have at least some information on the problems in the community reported by their patrols or by citizens; fire services will have some information from remote stations, alarm boxes, and citizen reports. Public transportation increasingly is linked to a central dispatch point by radio, and if a procedure has been developed to collect information from buses, taxis, and other mobile units, transit agencies will have a good idea of the scope and critical problem areas of the community.

The second major function of the direction and control element in such an emergency is to evaluate the information it has gathered and set priorities in responding. Actual or impending threats to human life, such as collapsed buildings or leaking dams, clearly are more important than threats against property only. The direction and control element must insure that resources are not depleted early in responding to minor problems, which typically are reported first, to the extent that nothing is left

when the VA hospital type of problem becomes known. An integral part of the priority-setting role of the direction and control element is continual revision of its situation analysis so that when subsequent problems of major dimensions do surface, resources can be shifted and concentrated quickly and effectively. This direction and control role also requires a centralized location at which all elements of the emergency service organization can share in setting priorities and charting out the best mix of forces to respond to individual problems.

A third major function of direction and control in a disaster without warning is to make an early determination of what outside help may be needed, and to take steps to alert and request mutual aid from adjacent or higher jurisdictions or from private sources in the community. To properly evaluate the need for outside assistance, and the type and size of assistance required, the direction and control element must know what resources it has already deployed, what resources it has left in reserve, and what special equipment and manpower the situation may require. Again, a centralized location—at which information on the situation is gathered and plotted, emergency response is dispatched and coordinated, and resource information on nearby or higher echelon agencies is stored—is critically necessary for timely requests for outside assistance.

EOC Physical Requisites

Location. The location of the EOC to suport the three major direction and control functions described above will generally reflect the same considerations that were discussed in the chapter on the normalcy period. An ideal EOC will be situated in a government owned building where the major emergency response agencies are located. This location will allow rapid activation of the EOC facility and allow access to needed records and information as well as communications, office supplies, and equipment and secretarial support. An ideal EOC will also be located near the centroid of the zone, to equalize response time to any potential problem area and to

permit effective use of short-range communications systems. The EOC should not be located, however, in an area that may itself be subject to damage, destruction, or isolation by the disaster agent. Thus, EOCs in earthquake areas should not be on or near fault lines or built on insubstantial soils or housed in structures that do not meet stringent seismic building codes. Nor should EOCs be located in flood plains or in dam inundation zones, or in central city areas that may be subject to conflagration. The ideal EOC will also be located away from facilities where hazardous materials are manufactured, stored, or transported; it will also not be located under airport approach paths or adjacent to other transportation routes that could become the scene of a major accident, reducing access to and exit from the control center. Finally, the ideal EOC will be so sited and constructed that it is easily secured and its essential communications and support systems are protected. This security is important in all disasters, because of the common phenomenon of conversion (see Reference 2), but especially in an emergency that includes elements of civil disorder or the threat of terrorism or sabotage.

Data and Display Requirements. These requirements in the ideal EOC will vary considerably with the size of the community served, the nature of the disasters that threaten it, and the preferences and procedures of the zone, area, and State. There is a basic set of data, however, that should be available in every EOC, either in the family of emergency plans, or in readily accessible files, or stored in dedicated data processing systems. Some of the major data requirements are listed in Exhibit III-1.

The first major display requirement in an EOC to support the information gathering function is some sort of problem or incident log. There are a number of devices for meeting this requirement; only three will be discussed here: chart, overhead projector, and data processing log.

The chart with plastic overlay can be posted in the EOC within view of

Exhibit III-1

EOC DATA REQUIREMENTS

1. Alert List
   Name and day and night phone numbers of key members of EOC staff and representatives of cooperating agencies (Red Cross, utilities, etc.)

2. Hazard Information
   Maps of flood zones and dam inundation areas, with schools and other critical facilities identified
   Maps of earthquake fault lines, soil types, and landslide susceptibility
   List of firms that manufacture, store, or transport hazardous materials, with day and night communications links
   Map of transportation routes and lists of transportation agencies with day and night phone numbers

3. Mutual Aid
   Lists of nearby zones, day and night phone numbers and communications links, names of contact persons and types of resources available
   Lists of county, State, and Federal agencies with types and quantities of resources available and day and night phone numbers
   Lists of predesignated Multipurpose Staging Areas with addresses, day and night phone numbers, and resources available

4. Media
   Lists of television, radio, and print media with day and night phone numbers
   Prepared advisory information for major disasters which threaten zone
   Procedure for accessing Emergency Broadcast System
   Procedure for activating warning system

5. Resource Information
   List of police manpower, vehicle, and equipment resources in and near zone
   List of fire stations, manpower, equipment, and vehicles in and near zone
   List of medical facilities, ambulance services, clinics, medical and paramedical personnel, drug and medical supply houses, and predesignated temporary first aid stations and Packaged Disaster Hospitals
   List of engineering resources in and near zone, both public and private, with day and night phone numbers and radio frequencies
   List of transportation resources, both public and private, with day and night phone numbers
   Lists of utilities with day and night phone numbers and system maps
   Lists of locations and communications links of predesignated mass care facilities and organizations detailed to operate them
   Lists of perishable and non-perishable bulk suppliers of food, with day and night phone numbers
   Lists of suppliers of bulk fuel and oil, with phone numbers
   Lists of suppliers of specialized equipment, including generators, pumps, compressors, sandbags, lighting equipment, bedding supplies, etc., with day and night phone numbers

all EOC staff; as problems are reported, they are logged sequentially on the chart with grease pencil, and a notation of time and disposition of the problem is made. An example of the form of such a chart is shown in Exhibit III-2. The advantage of this system is that it is simple to prepare and use. A major disadvantage is that it is frequently difficult to see (especially when someone is making entries) and it is not permanent; once all the lines are full the initial entries must be erased to make room for subsequent problems.

The overhead projector uses the same format as the chart in Exhibit III-2. Plastic sheets can be filed as they are filled up for future reconstruction of the sequence of events and response to them. The disadvantage of this system is that the projection of the log will be obscured whenever someone walks or stands between the projector and the screen, a common occurrence in the bustle and confusion of early EOC operations. Most overhead projection devices also require a darkened EOC room that may hinder other direction and control activities.

The data processing device logs problems and sorts them as follows: by service to which they are assigned for response; by type of response (total, partial, or not yet underway); or by area of the zone in which the problem is occurring. Portions of a sample program and printout are shown in Exhibit III-3.

A zone wishing to develop a computer based EOC data and display system can approach the problem in two ways. If the jurisdiction already has a data processing system which it uses day to day for other applications (computer-aided dispatch, financial management, personnel management), programs for emergency operations can be developed and stored on the main computer system. Alternatively, inexpensive minicomputers or microcomputers can be purchased and programmed by the emergency services agency of the zone. The examples in Exhibit III-3 and subsequent exhibits showing computer routines were written in the Basic language for a microprocessor system costing under $3,000.

EXHIBIT III-2

PROBLEM LOG

Incident Number	Date/Time of Report	Problem	Assigned To	Response

Exhibit III-3

PROBLEM LOG PRINTOUT

#	TO	TIME	WHERE	PROBLEM	RESPONSE
1	D	900	23E5	EMERGENCY DEFINITION	PARTIAL
2	D	905	23E5	FIRE STATUS/RESPONSE	COMPLETE
3	D	908	23E5	POLICE STATUS/RESPONSE	PARTIAL
4	D	914	23E5	PUB.SERV. STATUS/RESPONSE	PARTIAL
5	D	918	23E5	MISC. STATUS REPORT	PARTIAL
6	F	920	24B6	FIRE - ROYAL INN	PARTIAL
7	P	922	23E4	CLEAR EMERGENCY ROUTE	NONE
8	F	927	23C6	FIRE - WESTBOROUGH J.H.S.	PARTIAL
9	D	929	23E5	LEGAL REQUIREMENTS	NONE
10	F	933	24B5	FIRE - METROPOLE HOTEL	PARTIAL
11	S	937	24A5	SPRUCE AVE. BLOCKED	PARTIAL
12	S	938	23D3	SEWER BREAKS	NONE
13	W	939	23E5	MASS CARE FACILITIES	NONE
14	D	940	23E5	DAMAGE ASSESSMENT	NONE
15	P	942	24B5	CROWD/TRAFFIC CONTROL	NONE
16	F	943	25F2	FIRE/MUTUAL AID	NONE
17	P	945	23F6	LOOTING	NONE
18	S	947	23F5	HYDRANT BROKEN	NONE
19	F	949	24B5	GAS STATION FIRE	NONE
20	D	952	23E5	PUBLIC ADVISORY	NONE
21	P	955	23F3	INJURY ACCIDENT/FIRE	NONE
22	W	957	23F5	VOLUNTEER WORKERS	NONE
23	F	1000	23F3	FUEL TRUCK FIRE	PARTIAL
24	P	1003	23F5	PEOPLE INJURED/TRAPPED	NONE
25	P	1006	23E4	DRUG THEFT	NONE
26	P	1007	23E5	CROWD CONTROL	NONE
27	F	1010	24B5	FIRE/EXPLOSION	PARTIAL
28	S	1012	24C6	CHLORINE LEAK	NONE
29	F	1014	24B6	EXPLOSION RISK	NONE
30	P	1017	23F6	CROWD CONTROL	NONE
31	S	1019	23F5	VEHICLE REFUELING	NONE
32	D	1021	24C2	RESCUE/MUTUAL AID	NONE
33	W	1024	23F6	FOOD/MEDICAL SUPPLIES	NONE
34	F	1027	23C6	CASUALTY COUNT	NONE
35	D	1030	23E5	RESOURCE ASSISTANCE	NONE
36	D	1033	23E5	AFTERSHOCK DAMAGES	PARTIAL
37	D	1035	23E5	DAMAGE ASSESSMENT	PARTIAL
38	F	1037	23E5	FIRE MUTUAL AID	NONE

Associated with the problem log and keyed to it should be a large map of the zone with all special facilities such as fire stations, schools, hospitals, and convalescent homes marked. As each problem is assigned a number on the problem log, the number should be posted on the map at the appropriate location. The map can be attached to a magnetic surface, in which case magnetic markers can be used, or overlaid with plastic and marked with grease pencil. One major benefit of displaying problems in this manner is that non-reporting areas of the zone will be easily spotted, and a special reconnaissance of these areas can be dispatched.

In addressing the second major functional responsibility of the direction and control element—establishing priorities—a damage assessment procedure and display should be developed. Again, a chart or vugraph format can be used (Exhibit III-4 shows a simplified damage assessment format adapted from the one used in California). Damage assessment information can also be collected and manipulated on data processing equipment, which has the added capability of generating public information releases. Exhibit III-5 displays the functional relationships between agencies in the California damage assessment process.

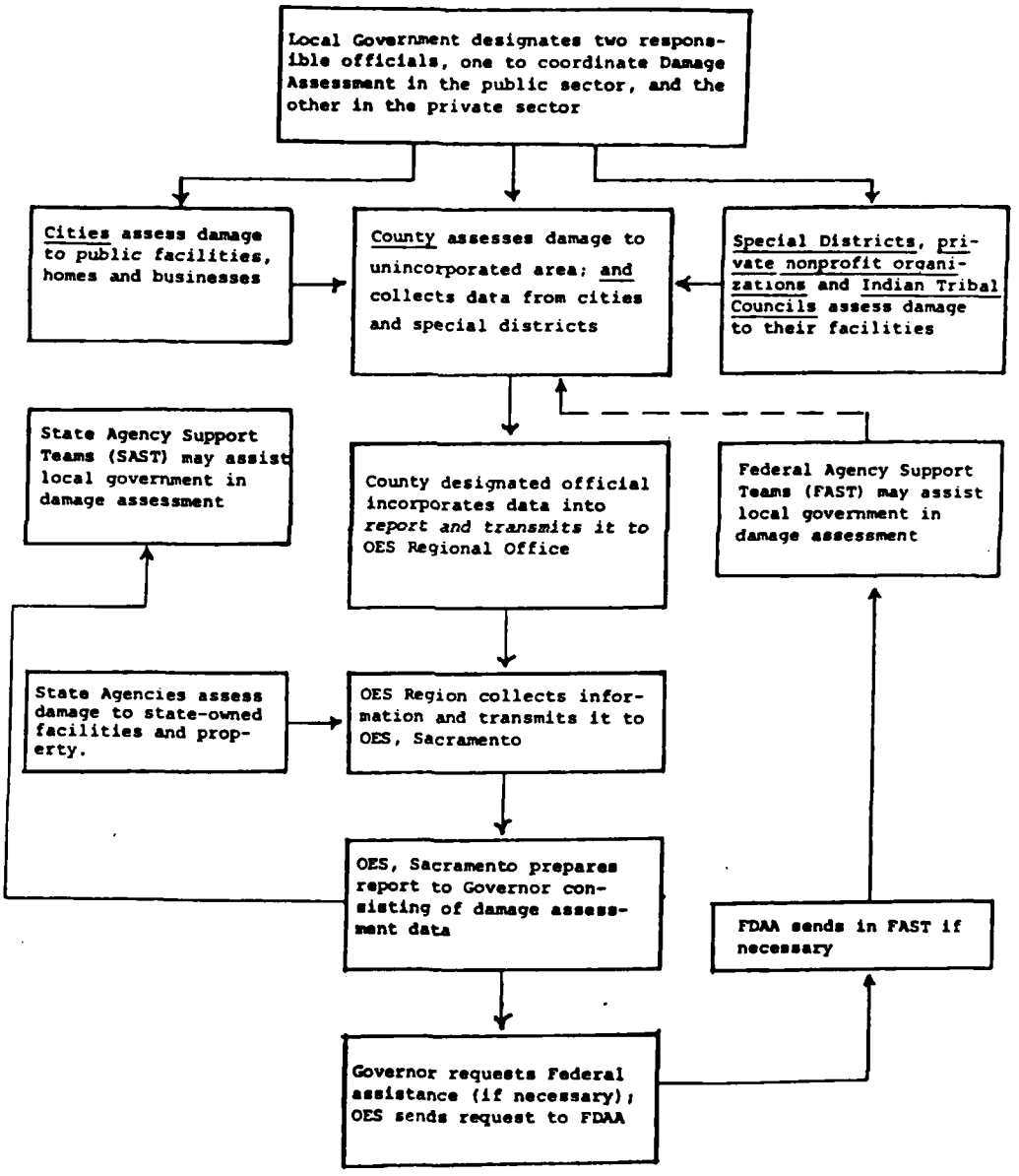
The damage assessment chart shown in Exhibit III-4 deserves some amplification and explanation. In a zone, line entries will reflect separate incidents. The time of the damage report should be entered, along with information on human and property losses. When a subsequent report from the same incident is submitted, the entire line should be erased and the new information entered. At any time a total report for the entire zone is needed for relay to higher echelons or for a public information release, columns should be totalled. Dollar loss figures can be estimated by assessors or building inspectors by noting the location of the incident, assigning approximate values to buildings or houses in that area, and multiplying by the number of units destroyed or damaged. These figures will be extremely rough and subject to substantial revision after on-site inspections, but will be of great use in establishing

Exhibit III-4
DAMAGE ASSESSMENT

PUBLIC SECTOR DAMAGE	Total Public Damage	$		
	Public Facilities	$	3D	
	Federal Facilities	$	3C	
	Schools Grades 1-12	$	3B	
	Fed Aid System Roads	$	3A	
PRIVATE SECTOR DAMAGE	Total Private Damage	$		
	Private Utilities	$	2I	
	Private Schools	$	2H	
	Private Hospitals	$	2G	
	Railroads	$	2F	
	Agriculture	$	2E	
	Businesses Destroyed	#	2D	
	Businesses Damaged	#	2C	
	Homes Destroyed	#	2B	
	Homes Damaged	#	2A	
	Number Dead	#	1B	
	Number Injured	#	1A	
TIME OF REPORT				
INCIDENT AND LOCATION				

Exhibit III-5

DAMAGE ASSESSMENT DIAGRAM



the scope of the disaster so that rough calculations of State and Federal assistance requirements can begin to be made. Early and accurate damage assessment reports to adjacent zones and higher echelons will help insure that outside assistance is forthcoming in appropriate amounts and in a timely fashion. Thus, damage assessment procedures are also required by the third major direction and control function in disasters without warning: evaluating outside assistance needs.

Other displays that will assist in managing the emergency response by local emergency services and mutual aid forces are shown in Exhibits III-6 through III-9. Charts or computer programs are the preferred display medium, and will include listings of critical facilities with current capacities and loading and listings of assistance forces with designations, locations, task assignments, contact persons, and communications links. The law enforcement mutual aid display at Exhibit III-9 can be used as a model for other emergency services, such as fire and public works.

Space and Furniture Requirements. These requirements in the Emergency Operating Center will vary with the size of the jurisdiction and its emergency staff and the availability of space in buildings owned or controlled by the jurisdiction. Two thousand square feet is recommended in Reference 3, but is not explicitly required by Reference 1. Generally, the larger the EOC, the more necessary is a smaller nearby conference room in which key staff can meet to discuss priority problems away from the noise and confusion of the main EOC room. Some recommended configurations and manning levels are included in Reference 4. Whatever the configuration chosen, which will depend on the size of the room and the staff and the shape of the room, an effort should be made to group together services that interact frequently (such as police and fire, medical and Red Cross). Services should also be placed close to whatever charts and displays they are assigned to maintain. Chairs and tables for all members of the emergency staff should be available. Bulletin boards, blackboards, or magnetic wall surfaces which can be written on with washable inks will prove useful

Exhibit III-6

HOSPITAL STATUS

	BEDS	BEDS AVAILABLE	PATIENTS SENT	BURN CASES SENT	COMMUNICATIONS	REMARKS
Hospital A 110 Main	120				368-1464	
Hospital B 847 Spruce	75				362-1211	
Hospital C 2028 Elm	50				493-1080	
PDH #704 Weldon Rec Ctr 85 Mission	200				493-6861	

Exhibit III-7

TEMPORARY MEDICAL FACILITIES

FACILITY	LOCATION	PATIENTS TREATED	COMMUNICATIONS	REMARKS
FAS-St Lukes Church	475 Walnut		362-1848	
FAS-Central High School	47 Grove		367-8613	
FAS-Morton Community Center	1083 Pine		492-8486	
Downtown Clinic	1430 Main		493-1444	

Exhibit III-8

TEMPORARY MORGUES

FACILITY	LOCATION	CAPACITY	BODIES SENT	COMMUNICATIONS	REMARKS
City Morgue	586 Main	15		363-1847	
Adams Mortuary	737 Green	5		362-6681	
Green Mortuary	1800 South	10		492-1227	
National Guard Armory	1682 Harbor	100		364-1819	

Exhibit III-9

LAW ENFORCEMENT MUTUAL AID

UNIT	LOCATION	COMPOSITION	ASSIGNMENT	COMMO	REMARKS

for posting special notices, policy decisions, special communications links and frequencies, and other such information.

Equipment and Supply Requirements. Equipment and supplies needed in the ideal EOC will of course include the full range of office supplies, including typewriters, calculators, pencils, pens, grease pencils, chalk, tacks, magnets, plastic for overlays, papers, and preprinted message forms and record-keeping devices. Copying machines on rollers will be useful to reproduce message forms, checklists, and other written material needed for the historical record or for public information activities. The ideal EOC will include in its design storage areas or furniture to hold the equipment and supplies needed. One way to meet this need in an EOC that is not permanently manned or dedicated (such as a general purpose meeting room) is to obtain new or used hospital bed tables on rollers which can be assigned to each service and used to hold its plans and basic supplies. If the EOC must be relocated during the emergency, these tables will be easy to move.

Communications Requirements. Communications requirements are the central key to effective direction and control of a disaster. Without communications to field forces, the direction and control element cannot fulfill its information-gathering or priority-setting function. Without communications to adjacent zones and higher echelons, it cannot mobilize and coordinate assistance forces.

The primary communications systems the EOC will use are the basic radio systems of the police, fire, and medical services of the jurisdiction. Close attention to good radio procedure is especially important in the disaster context because of the high volume of messages and information that must be transmitted. Training and exercising dispatcher staffs in disaster simulations, while frequently resisted because of potential interruptions by day-to-day traffic, are essential in developing good radio discipline and strong net control by central dispatchers.

The disaster agent itself in many cases will put the communications system

in jeopardy. Earthquakes, windstorms, fires, and flooding can disrupt service by damaging or destroying antenna systems, repeaters, or base stations. Communications facilities and equipment should be designed, installed, and maintained with these considerations in mind, and where practical, replacement equipment, especially antennas, should be kept in stock.

A well-designed communications system will include the capability of sending and receiving messages to and from adjacent jurisdictions and higher headquarters. At a minimum, all primary frequencies of neighboring zones should be listed in EOC resource or data collections.

In the stress of a major disaster, primary local government radio systems are seldom capable of handling all the information flow that the situation requires. Plans should therefore be made and necessary equipment purchased so that the EOC can effectively use privately owned radio equipment and operators, particularly ham radio and citizens band. Ham radio can provide both short and long-range communications by voice and radioteletype (RTTY); citizens band, though it has a larger pool of operators and radios, is typically short-range and may present problems of poor radio discipline in the emergency situation. Either service, however, can assume at least part of the emergency communications load by establishing links with incident scenes, mass care shelters, medical facilities, and other areas without communications. To be effective, these assignments should be made in advance and should be incorporated in the emergency organization's basic planning documents.

Monitoring capabilities should also be included in an ideal EOC. Television and commercial radio receivers will enable the direction and control element to inform itself about the situation in other zones and to evaluate the dissemination of its public information and advisory announcements. In areas subject to severe weather phenomena such as tornadoes, the EOC should have some means of monitoring weather reports which are broadcast continually on special frequencies (direct two-way communication

between EOCs and the National Weather Services should be reserved for area and regional EOCs).

In addition to the direct radio communications, backup services, and monitoring capabilities mentioned above, an ideal EOC should have an intercom and public address system for use during emergencies. Intercom systems will allow direct two-party and conference call communications across a noisy EOC, and if connected to a larger system, will allow EOC representatives to contact their offices as necessary. A public address system will enable the director of emergency services to alert the entire EOC staff to a particular problem or to make known an important policy decision that all should be aware of.

The EOC should also have control of, or access to the controllers of, the jurisdiction's warning system. Warning systems and their use are discussed more fully in the subsequent chapter.

Protection Requirements. *Protection requirements of the EOC in a disaster* without warning are closely related to considerations of location. As discussed above, the EOC should be sited away from flood and other hazard zones and constructed to earthquake-, wind-, or tornado-resistant standards. It should also be secured and protected by police or guard personnel who can insure that only authorized persons have access to the facility.

Staffing

The staff assigned to the Emergency Operating Center will depend on the size of the zone and the manpower available to it. Civil Preparedness Guide 1-5, Standards for Local Civil Preparedness, does not address the issue of composition of EOC staffs. A list of potential EOC representatives is included in Exhibit III-10.

A recurring issue in staffing EOCs is whether chiefs of services, particularly police and fire chiefs and public works directors, should be in the EOC or at the scene of the disaster. To a great extent, the nature of the emergency itself will determine

EXHIBIT III-10

EOC STAFFING REQUIREMENTS

Director of civil defense or emergency services
- Civil Defense Coordinator and staff
- Public Information Officer
- Situation Analysts and Plotters
- Communications Officer
- Radiological Defense Officer
- Warning Officer
- Procurement representative

Police representative(s)
Fire representative(s)
Public Works/Engineering representative(s)
Health/Medical reqresentative(s)
Welfare/Shelter representative(s)
Utilities representatives
- Water
- Electricity
- Gas
- Sanitation

Resource representatives
- Food
- Housing
- Transportation
- Telecommunications
- Petroleum products

Representatives of voluntary agencies
- Red Cross
- Salvation Army
- Church groups
- Radio amateurs
- Citizens Band groups

State and Federal representatives

the answer. In a point-type disaster with only one locus, such as a transportation accident, fire, or hazardous materials spill, the chief will probably go to the scene in order to command operations, and will delegate EOC liaison responsibilities to a subordinate. In more widespread disasters that create multiple problems, however, there is no single 'scene' to go to, and the chief will be better served to operate out of the EOC where more complete information is available. Alternatively, he or she may decide to remain in the central office or dispatch point of the agency, again delegating EOC representational duties to a subordinate. The preferences of the jurisdiction's chief executive as to where his or her service chiefs are located will also weigh heavily.

EOCs have frequently been compared to military tactical operations centers, with the observation that company commanders are in the field with their forces and that the TOC is manned by staff people and specialists. Again, the comparison is more valid in the point-type disaster situation than in a generalized disaster. The military company commander is responsible for one unit with a clearly defined mission; the zone service chief is responsible for many units which must be able to respond flexibly to changing disaster demands and to interact closely with other organizational elements.

Whatever the local resolution of the question of who responds to the EOC, the civil defense director must assure that all service representatives are capable of meeting the basic direction and control functional responsibilities: gathering information, setting priorities, and coordinating multi-agency response.

Area Level

Environment

The discussion of the emergency environment at the zone level is applicable to the area as well. The area, however, will be concerned with the larger picture of

what is happening in all the zones within its sphere. It will have to determine what zones have been most severely impacted and what zones have escaped damage and are thus able to provide assistance. It will also be coordinating its own service agencies in responding to problems within its own sphere of responsibility (if the area is a county, unincorporated portions therein will look to county forces for disaster response). The area will also concern itself with passing collected information from zones on to higher State and Federal levels.

Direction and Control Functions

The first function of the direction and control element at the area level will be to organize, deploy, and coordinate activities of its own forces in responding to area problems or in providing assistance to hard hit zones. Although units may be dispatched from agency locations, the coordinating function—deciding what and how much goes where, and what mix of forces will be sent—requires a central emergency operating center.

Other roles of the area direction and control element parallel those discussed above in the zone context. The area direction and control element must gather and analyze information from zones so that priorities can be established and mutual aid arranged. In addition, the area bears key responsibility for passing accurate reports to State and Federal levels and for providing public information to media, which frequently are organized primarily at the area rather than zone level.

EOC Physical Requisites

Location. The location of the ideal area EOC will generally entail the same considerations that were given for location of the zone EOC: in a government-owned building near the area centroid, sited to avoid potential hazards, and constructed to hazard-resistant building standards.

Data and Display Requirements. These requirements will be substantially greater than those for a zone EOC. All these items of data listed in Exhibit III-1

should be on file at the area EOC as well. In addition, the area EOC should have information on the characteristics and resources of each of its zones. Exhibit III-11 shows the type of information that should be collected for each zone; Exhibit III-12 gives an example of a zone fact sheet.

Because of the special importance of damage assessment at the area level (in order to fulfill its responsibilities to inform the public and higher levels of government), the damage assessment form introduced in Exhibit III-4 will be even more essential. Instead of incidents in the first column, each line will be assigned to a zone.

Problem logs at the area level will also be more sophisticated than those used by zone EOCs. Only major problems should be logged, and columns should be added to indicate what area, State, military, or adjacent zone forces have been asked to respond to a given problem.

In weather-related disasters, maps of the area should be available to plot predicted storm or tornado paths or expected flood inundation zones. Communications and facsimile device links to National Weather Service offices are discussed below.

Space and Furniture Requirements. These requirements will be proportionately larger than those for zone level centers. An ideal area EOC will be dedicated to EOC use only and will include conference rooms where key direction and control staff members can sequester themselves for policy discussions, briefings, and consultations with elected officials.

Communications Requirements. At the area level the communications requirements will be more sophisticated than at the zone level. A direct link to the National Warning System (NAWAS) should be located in or near the EOC. There also should be radio linkages (voice and teletype) down to all zones in the area, over to other areas in the region, and up to region and State EOCs. For weather emergencies, facsimile devices are available which will allow transfer of map-based information

EXHIBIT III-11

TYPES OF INFORMATION FOR FACT SHEETS

General

- Name of jurisdiction
- Local governments in zone
- Population
- Title(s) of chief executive(s)
- Characteristics (urban, rural)
- Area of zone in square miles

Direction and Control

- Name and title of key officials
- Staging areas
- Public information (EBS, media)
- Emergency Operating Centers (location, protection, communications)
- Radio frequencies
- Availability of mobile command post

Law Enforcement

- Name and title of key officials
- Personnel resources
- Vehicles
- Headquarters location
- Radio equipment and frequencies

Fire

- Name and title of key officials
- Personnel resources
- Vehicles and equipment
- Headquarters location
- Radio equipment and frequencies

Medical/Health

- Name and title of key officials
- Hospitals (locations, capacities)
- Pharmaceutical and medical supply houses
- Medical communications and frequencies
- Nursing homes (locations, capacities)
- Ambulance inventory, personnel, locations
- Mortuary services and capacities

Shelter/Welfare

- Name and title of key officials
- Congregate care facilities (locations, capacities, personnel)
- Mass feeding facilities (location and capacities)

Resources and Support

- Name and title of key officials
- Transportation resources by agency
- Electric utilities
- Food distributors and processors
- Public works departments (locations, resources, personnel, communications)
- Water utilities

Other Key Facilities and Resources

- Federal
- State
- Industrial
- Military

EXHIBIT III-12

EXAMPLE FACT SHEET

LAURENS COUNTY

General

1970 Population: 32,738 — Area: 810 sq. mi.
Urban 46% (15,000) — Housing Units: 10,596
Rural Non Farm (14,700)
Farm(3,000)

County Seat: Dublin (15,143 pop.) - County Courthouse

Communications	
Phone	Radio
N.S.*	N.S.

Direction & Control (County CD Director)

Emergency Operating Center — Basement Laurens Co. Courthouse-Dublin
Public Broadcast Station - N.S.

Police Services (Sheriff)		Phone	Radio
Sheriff's Department	(19 personnel 6 mobile units)	272-4545	N.S.
Dublin P.D.	(30 personnel 6 mobile units)	N.S.	N.S.
East Dublin P.D.	(3 personnel 2 mobile units)	N.S.	N.S.

Fire Service (Chief, Dublin F.D.)		Phone	Radio
Dublin City F.D.	(29 personnel 5 pumpers)	N.S.	N.S.
County Volunteer F.D.:			
- Dudley	(20 personnel 2 pumpers)	N.S.	N.S.
- Cadwell	(10 personnel 1 pumper)	N.S.	N.S.
- Rentry	(16 personnel 1 pumper)	N.S.	N.S.
- Dexter	(15 personnel 1 pumper)	N.S.	N.S.
- East Dublin	(10 personnel 1 pumper)	N.S.	N.S.

Medical/Health (Director, Co. Health Dept.)	Normal Bed Capacity	Phone	Radio
Hospitals			
- Clariton (private) 509 Bellevue Ave. Dublin	55	272-3422	N.S.
- Laurens Memorial, Dublin	154	272-2323	N.S.
- Veterans Administration, Dublin	1,016	272-1210	N.S.
Nursing Homes			
- Graveland Convalescent, Dublin	58	N.S.	N.S.
- William Mary Memorial, Dublin	67	N.S.	N.S.
- Dublinnir Nursing Home, Dublin	76	272-7437	N.S.
Medical Supplies and Pharmaceuticals			
- No wholesale suppliers			
- 13 drug stores obtain stocks from Macon, Ga.			
Mortuary			
- 6 funeral homes, 8 licensed morticians, 12 hearses, 2 ambulances			

*N.S. - Not Specified

Exhibit III-12 (Concluded)

Medical/Health (continued)

Ambulance Services
- Contractor: 4 ambulances, 11 emergency medical technicians

Primary Medical Aid Station Locations	Phone
- East Laurens High School, Dublin	272-3144
- West Laurens High School, Dublin	272-8452
- Dublin High School, Dublin	272-3440

Medical and Allied Professionals(N.S.)

Shelter/Welfare (Director, Dept. of Family Services)

Zone	Facilities	Congregate Care Spaces
A	10	3,475
B	6	15,305
C	10	554
D	23	7,079
	49	26,403
E	10	1,618
F	11	4,671
G	4	555
H	17	13,229
	42	20,073
I	4	6,563
J	20	3,968
	24	10,531
TOTAL	115	57,007

Food Preparation and Serving Establishments	Capacity
- 16 public school lunchrooms	N.S.
- 15 FSP Outreach Churches	N.S.
- 23 restaurants	N.S.
- 19 short order establishments	N.S.

Resources and Support (Director, Public Works Dept.)

		Phone
County Public Works Department - 89 employees, equipment	N.S.	272-4522
Dublin City Public Works Dept. - 102 employees, equipment	N.S.	272-1620
Transportation	N.S.	N.S.
Water Supply	N.S.	N.S.
Electric Power	N.S.	N.S.
Food Supply	N.S.	N.S.
Essential Industries	N.S.	N.S.
Etc.		

from National Weather Service offices to the area EOC; such graphic information will considerably enhance the Weather Service voice reports which will be transmitted over NAWAS.

The area should also have direct access to the Emergency Broadcast System station serving its territory in order to meet its public information responsibilities.

Finally, the area EOC should of course have communication with its own field units, and with voluntary agencies serving its population. Radio amateur and citizens band capabilities should also be included in the area EOC communications package.

Protection Requirements. These requirements for the area EOC in a disaster without warning will include those factors cited in the discussion of zone EOCs. Additionally, it is at the area level that the requirement for alternate EOCs begins to emerge strongly. Although even zone plans should include specification of alternate EOC sites (typically in the continuity of government sections of direction and control annexes), the role of the area as hub and clearinghouse for information and coordination for several zones means that alternative EOCs must be more than simply designated in plans. There must be a practical capability to relocate the EOC staff and necessary supplies, data, and displays, as well as the core of the communications capability. A mobile communications van with major area agency frequencies will in great measure fulfill this need.

Staffing

The staff of the area EOC will include all or most of the representatives identified in Exhibit III-10. Of particular importance, in view of the increased requirement for effective damage assessment, will be the presence of a trained and competent situation analysis staff. One likely source of this staff might be the jurisdiction's planning department; sheriff's offices may also provide experienced man-

power to assume this responsibility.

Of equal importance is the need for an experienced public information officer. If the jurisdiction does not have a permanent PIO, a seasoned member of the management staff could fill the role. Whoever is chosen should know local media representatives and understand their needs and idiosyncracies. He or she should also have prescripted advisories at hand for the major disasters likely to affect the area.

Utility and medical representatives are also more typically available at the area level rather than the zone level. Few zone jurisdictions are of sufficient size to have their own medical or utility services, with the possible exception of water. To effectively gather, evaluate, and respond to disaster information requires the participation of medical and utility managers and representatives of other resource services listed in Exhibit III-10.

Region Level

Environment

A disaster occurring without warning is unlikely to require an immediate response from regional assets equivalent to that required by zones and areas. Only the most major disasters — a great earthquake, widespread series of tornadoes, or a hurricane — will provoke a substantial response from the region.

It bears repeating that in the analytical framework of this report, the regional level is somewhat amorphous and ill-defined. In developing ideas about ideal EOC structures and systems, we simply assume some direction and control level between the county-sized 'area' and the State EOC. Chapter XI investigates several attempts to define a regional layer more closely.

Direction and Control Functions

Where regional direction and control systems exist, their functions in the disaster without warning context will be limited. Like zone and area level direction and control

elements, the region will be collecting and evaluating information from areas, and passing the compiled results on to the State EOC. A major responsibility will be the brokering of mutual aid between areas, and the coordination of State agency response. Finally, the regional direction and control element will be the level to which scarce or specialized resource requests will be funnelled and attempts made to satisfy these special needs.

For any and all of these direction and control functions, it would be difficult to make a case for a permanent emergency operating center. Most of the roles assigned to a regional direction and control staff can be handled out of an office with a basic communications package linking it to area EOCs. The fact that regional staffs are likely to be widely dispersed in various agency locations throughout the region will make it difficult to assemble an effective direction and control operation in time to significantly influence the response to the disaster, even if an EOC is available. For this reason, discussion of what a regional EOC should include and how it should be staffed will be investigated later in this report when its role is more central and critical — the crisis period of a nuclear emergency.

IV. DISASTER WITH WARNING

Zone Level

Environment

Disasters frequently preceded by some warning period include storms and hurricanes, tornadoes, tsunamis, floods, volcanic eruptions, landslides, and predicted earthquakes. For a well-trained, well-equipped emergency organization, the warning period provides the opportunity to mitigate disaster effects, move people and equipment from danger, and alert emergency forces and mutual aid before the major impact of the disaster.

Direction and Control Functions

In a disaster with warning, all of the direction and control functions identified in the previous chapter will apply, as well as four new functions that become possible when the main shock of the disaster agent is preceded by some physical signs of its approach.

The most important additional function of the direction and control element is to warn the public. To do this, the direction and control staff must gather information about the disaster agent from higher level direction and control nodes and from agencies responsible for monitoring the environment such as the National Weather Service, the Geological Survey, and State level organizations that observe stream flows and meteorological phenomena.

A second important function of the zone direction and control element is to decide whether evacuation of the community, or parts of it, is required. If a determination is made that evacuation is necessary, the direction and control element must manage the promulgation and dissemination of the evacuation order, oversee the movement, and manage the mass care facilities to which evacuees are directed.

Advance notice of a disaster will also furnish opportunities for the direction

and control element and its emergency forces to reduce disaster impacts by short-term mitigation measures. Thus, a critical function of the direction and control staff will be to organize and implement the construction or improvement of levees and dikes, the securing or removal of equipment, the shuttering of windows and doors, the clearance of storm drains and channels, the shutting down of hazardous manufacturing processes, and the lowering of reservoir levels. In large measure, the success of such mitigation efforts will depend on the pre-planning that has been done in the normalcy period.

A final direction and control function made possible by the warning period is the alerting and readying of emergency service units, within the zone and in neighboring zones, and at higher echelons. Equipment can be checked, procured, or borrowed, personnel can be put on longer shifts, and reserves and auxiliaries can be assembled. Mass care centers can be staffed and opened, and the public informed of their locations and services. Stocks of food, water, medical supplies, and sanitation equipment can be obtained and pre-positioned. State and Federal military and civil preparedness agencies can be called up and tasks assigned.

EOC Physical Requisites

Location. If an EOC is situated in the path of the disaster agent, or in an area where access and egress may become difficult, the warning period provides an opportunity to move the EOC to a suitable alternate site. Equipment, supplies, and staff can be moved expeditiously if plans have been made and alternate sites preselected and prepared. A standby communications van with law enforcement, fire, public works, and medical frequencies and telephones that can be rapidly patched in by the local telephone company will greatly enhance the capability to relocate the EOC without seriously degrading its ability to direct and control preparatory and mitigation activities. Again, preplanning with the relevant organizations (telephone utility, radio amateur and citizens band groups) will permit uninterrupted management of the crisis.

Data and Display Requirements. All of the data, charts, and other data manipulation and display techniques and devices mentioned in the previous chapter are also required for effective operations in the disaster with warning situation. Special data needs in this context include current information on the path of the storm, tornado, or floodwaters, and a map of the jurisdiction on which to plot this intelligence. Also needed is a map of evacuation routes and traffic control points, with indications of where sheltering and feeding operations are located. Multipurpose staging areas should also be shown on this map or listed prominently in the EOC where services requesting mutual aid can refer to them in directing assisting units into the jurisdiction.

Space and Furniture Requirements. More space in or near the EOC may be needed in a disaster with warning, including areas in which media representatives can be briefed. If the zone is served or covered by radio and/or television stations, the participation of their representatives will be critical in insuring that clear and direct advisories are provided to the public on what to do and not to do, where to go and not to go, and where to evacuate from and relocate to. The direction and control staff should consider inviting small groups of media representatives into the EOC to photograph weather maps and observe operations.

Equipment and Supply Requirements. In addition to the EOC supplies and equipment described in the previous chapter, the direction and control element in a disaster with warning will need signs to mark evacuation routes, shelters, off-limits areas, and medical stations; these signs should be prepared and stored during the normalcy period. Sirens or other warning devices will also be needed, although their effectiveness in communicating danger to the public will depend on public information activities undertaken during the pre-disaster stage. Handheld loudspeakers will prove useful in augmenting the fleet of vehicles that can be used for block-to-block evacuation warnings; these devices also are valuable in managing congregate care facilities.

Communications Requirements. Special communications requirements in

a disaster with warning include the siren and loudspeakers suggested above. The siren system should be so designed that it can be activated from the EOC, or from a communications facility closely associated with it. In addition, a zone level EOC should maintain a monitor capability on Weather Service frequencies and commercial radio bands.

Protection Requirements. The EOC will be protected against damage and disruption to the extent that it has been properly sited away from hazardous areas in the first place. The second line of defense is the capability to move the EOC, its staff, and its essential communications and support systems to alternate locations.

Staffing

The staff of the direction and control element will include the persons identified in the previous chapters. To meet the increased responsibility to warn, evacuate, and mitigate, the EOC workforce should be augmented by additional public information personnel, by more police officers to manage any evacuation that is required, and by representatives of voluntary agencies that can assist in performing mass care functions and in providing labor for mitigation efforts. Those unfamiliar with the EOC and its operations and procedures should be given a short briefing on how the system works and on what their roles are in it.

Area Level

Environment

Observations made above about the disaster with warning at the zone level are also applicable at the area level. The area level, however, will play a larger role in coordinating and arranging for mutual aid and in providing manpower and equipment resources to assist in mitigation activities.

Direction and Control Functions

Roles of the area direction and control element parallel those of the zone, with a proportionately larger responsibility for public information activities in places where

media are area-based. The area also must play an important role in coordinating mitigation efforts among the zones under its cognizance. Mitigation activities will depend in large part on effective mutual aid systems between zones, areas, and regions, and the area is the level at which such systems are set into operation and coordinated.

EOC Physical Requisites

Location. Considerations of siting and of relocation ability apply to area EOCs even more than to zones. To effectively support the coordination mission of the area direction and control element, the EOC must remain operational throughout the warning period and disaster impact. Again, a van with communication links to field units of the area, to zone EOCs, and to regional elements will assure that the area EOC can fulfill its functional responsibilities.

Data and Display Requirements. The mutual aid tabulations introduced in the last chapter (Exhibit III-9) will enable the area direction and control element to keep track of mutual aid forces, staging areas, and communications links. In addition, the area EOC map should include symbols designating preselected multipurpose staging areas, or these staging areas should be otherwise listed prominently in the EOC. When help is requested, the requesting zone (or its agent, the area) can then direct assistance units to an appropriate location with parking space, fuel, feeding and billeting facilities, and communications capabilities.

To perform its information-gathering role, the area EOC should be tied to the National Warning System and the National Weather Service. Facsimile machines which can reproduce weather maps will be extremely useful in weather-related disaster phenomena.

Space and Furniture Requirements. Extra space may be needed in or near the area EOC in disasters with warning in order to accommodate media representatives, a critically important component of the warning and public information system. Additional space and work surfaces may also be needed for other augmentation

staff discussed below.

Equipment and Supply Requirements. If zones have not laid up the necessary signs described above, the area direction and control element should be prepared to provide them. Because of its generally larger role in public information, the area direction and control element should have stocks of boilerplate public advisories and skeleton press releases describing the danger, identifying individual and family level mitigation strategies, and defining evacuation routes and destination mass care centers.

Communications Requirements. Area EOCs should have direct communications access to NAWAS and to the EBS system. Area EOCs also should have direct communication with regions (where they exist) and with adjacent areas that may be able to provide mutual aid.

Protection Requirements. As with zone EOCs, protection of the area direction and control staff will be afforded by proper siting of the EOC away from likely hazard areas, and by the capability for moving to alternate control centers.

Staffing

The inclusion of media representatives on area EOC staffs will enhance the ability to communicate quickly and clearly to the public. The area direction and control element should also be prepared to expand, in disasters with warning, to include representatives of private contractor associations, voluntary agencies, and other groups that can contribute to mitigation efforts. The area direction and control staff should also have the ability to call for, register, assemble, transport, and supervise individual volunteers who may wish to assist in mitigation activities. Where military units are based in the area, there should be a representative from them on the area EOC direction and control staff.

Region Level

Environment

When sub-State regions exist, they can perform useful roles in coordinating the

application of State resources and Federal assets, particularly in mitigation tasks. Weather-related disasters may affect several areas, and regional level coordination will assist in coordinating area-to-area and State-to-area mutual aid.

Direction and Control Functions

The major function of a regional direction and control staff will be the management and correlation of State assistance forces. In addition, this level can be a focal point for liaison with agencies at State and Federal levels that monitor the environment and provide information on which area and zone level warnings and evacuation decisions are based.

EOC Physical Requisites

Because of the general wide dispersal of regional direction and control staffs, EOCs are typically difficult to activate in time to affect pre-disaster direction and control. The following chapter reviews the requisites for such facilities, and Part Two explores several options for developing a nationwide regional system.

V. CRISIS

The rather linear analysis of preceding chapters must now yield to a more complex treatment. From the point of view of direction and control functions and EOC needs, the crisis period may be viewed as consisting of three phases: early crisis, deepening crisis, and mobilization (which could be followed by either relocation or movement to in-place shelter). Different phases impose different responsibilities and requirements on the various levels of direction and control. An additional complicating factor is that some zones are designated as host and some as risk; the designation of host or risk will place differing direction and control burdens on different zones. Finally, during the first two phases, zones at risk must prepare for both the in-place shelter and relocation contingencies. When a decision to relocate is made by the President, a whole new set of direction and control functions and EOC requirements is imposed on direction and control elements in both host and risk areas.

To accommodate this complex set of contingencies and variables in the analytical frame of this report, the environment of the period is described first, covering events at all three hierarchical levels. Then, the chapter is divided into three sections, reflecting the three phases of the crisis period. Within each section, the direction and control functions and EOC and staffing requirements for all three levels are discussed. Host and risk area distinctions are made, where relevant, within the main body of the discussion at each level.

Exhibit V-1 helps to conceptualize the time and activity flow and relationships during the crisis period.

Environment

No one knows if, when, or through what stages a future nuclear crisis may develop, or what the outcome will be. We can assume that a future crisis would be

initiated by international tension and would escalate rapidly or gradually as the seriousness of international events increased. Along the progression of crisis development (Exhibit V-1) one might identify such portions as **early crisis** and **deepening crisis** without defining exact periods of time. Up to some (unknown) point in the deepening crisis, there would be no Federal commitment, and the states, in turn, would not want to commit effort, resources, and funds until assured that such commitments were justified, and perhaps underwritten by the Federal government.

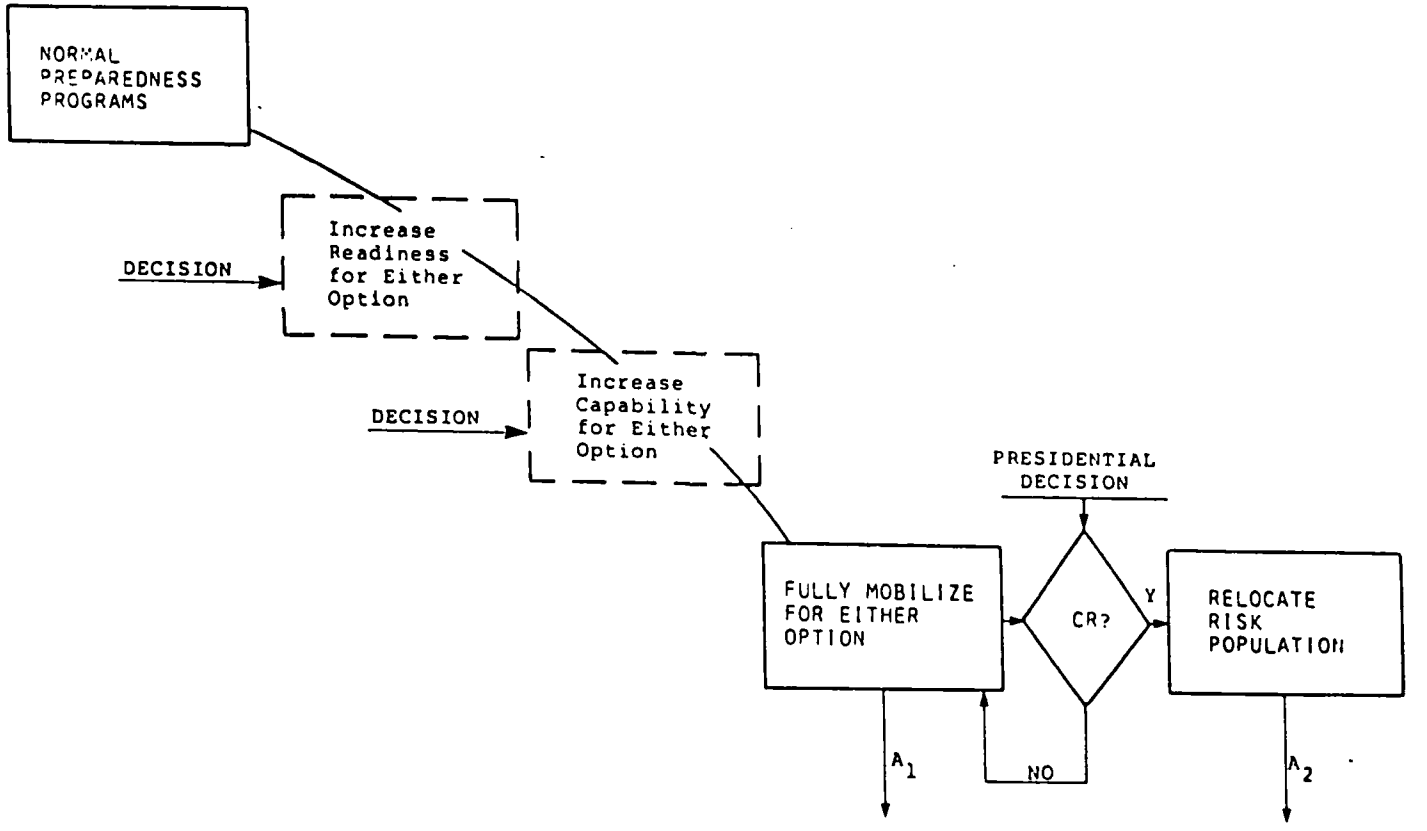
The crisis-oriented actions at this stage would not interfere with normal day-to-day business of the local jurisdictions, because the actions would not require additional funding and would be conducted in the normal operating facilities. We could call this activity an "internal readiness" effort under a condition of low visibility and low cost. Since at this stage no one could know whether or not the crisis would escalate, the crisis response would include both in-place protection and crisis relocation options.

At some time during a deepening crisis, the change from normalcy to emergency would occur, with a general recognition that nuclear attack could come. The general public and responsible officials at all levels might become more deeply concerned. The first perceptible spontaneous evacuations might occur, and state and local governments might initiate in-house preparedness measures prior to any official guidance from the Federal government. Some general characteristics of local responses to a deepening crisis might be as follows:

- The preparedness measures would primarily be driven by local decisions made in response to the changing perception of the threat, until the crisis intensified to the point where the Federal government issued advice and guidance. These decisions would very likely be uncoordinated, and the pace of readiness in one jurisdiction might be greater or less than that in another jurisdiction.
- Response actions would prepare for either option, whether or not the

Exhibit V-1

CRISIS MOMENTUM CHART



crisis relocation decision would be made later. In many instances the unijurisdictional framework for in-place protection might compete with or conflict with the interjurisdictional framework for eventual crisis relocation. Whoever the local decision-makers were, they would have to solve the competition problem at successive points in the preparedness effort.

- o Any substantial preparedness actions that would materially improve capability or reduce vulnerability would certainly require changes in funding and priorities, and would not be feasible within the currently funded low-visibility program.

At some point during a deepening crisis, the President may declare a state of emergency. This assumed declaration of emergency would correspond to the beginning of the mobilization phase, when a massive commitment of resources to nuclear civil protection would occur. At the same time, major changes in priorities would be required. Entire communities would be concerned, and it would be feasible to flesh out the required emergency organization. Many ongoing normal programs would be curtailed or shut down. The funding constraints would be eased, or more likely removed, and there would be a full mobilization of effort and commitment of resources to the task of improving NCP capability.

As in the preceding phases of the crisis, mobilization would be concerned with both in-place and relocation options, giving rise to major problems regarding the most effective use of the available resources and time. The mobilization period would continue with three possible outcomes: crisis relocation, movement to in-place shelter, or crisis resolved. The first two outcomes are considered in this report. If a decision to relocate risk area populations were made during this period, mobilization would continue during the relocation movement and afterward. For example, expanding the shelter base in host areas to accommodate the relocatees would be a mobilization

activity.

One further distinction needs to be made before proceeding with the analysis of direction and control roles and requirements at the various hierarchical levels. Designations of areas as risk and host will change over time as perceptions of enemy intentions and strategic objectives change and as potential U.S. military, economic, and population targets shift. A zone or area direction and control element will never know past a reasonable probability that it will or will not be attacked. Thus, in-place protection will always be an important part of the NCP planning and preparedness program.

Early Crisis

Zone Level

Direction and Control Functions. All zones, whether designated host or risk, will review and improve plans for both protective options: in-place shelter (CSP) and relocation (CRP). Direction and control elements will also increase public information efforts. Although emergency public information (EPI) materials will be prepared primarily at higher levels, the zone is the responsible agency for ultimate dissemination. It also must augment advisories to make them site-specific; residents should know where local shelters are (CSP) and what relocation area the community has been assigned to and how to get there (CRP). All zone direction and control elements during this phase should also undertake steps to increase readiness of public agencies and private citizens. Training programs in radiological defense, first aid, and basic fire fighting and rescue should be begun or intensified. These training efforts serve two important goals: increasing skills and emphasizing the seriousness of the situation. Crisis relocation exercises for the emergency organization should be organized and conducted both at the zone level alone and in conjunction with areawide tests.

In addition to the above generally stated direction and control roles, risk-area management staffs should either activate the zone EOC on a standby basis

or undertake actions to upgrade it for immediate activation if the crisis deepens. Representatives of essential industries in the zone should be selected to serve on EOC staffs and trained in the use of the facility. Shelter upgrading programs should be initiated and warning systems tested and widely publicized.

In zones designated as host, major direction and control efforts should be focused on preparing to receive relocated populations. Food, medical, and other supply sources should be identified and plans for increasing stocks should be reviewed. Preparations for receiving risk-area relocatees should be stepped up, including crash training programs in reception/care/sheltering, and rapid augmentation of shelter capacity.

EOC Requirements. The general functions sketched above for the direction and control element at the zone level can probably best be accomplished in the everyday workspaces of responsible direction and control cadre. Protection is not needed and communications can be conducted in routine fashion by phone. There is a need for close coordination of effort, however, and this need can perhaps best be met by calling together the direction and control element once a day in the EOC facility to discuss plans, problems, progress, and prospects. Such meetings will both assure close coordination of crisis activities and provide an opportunity for increasing familiarity of the staff with the EOC and its facilities. Communications checks can also be run at or after these EOC meetings.

In risk areas, an argument can be made for activating the EOC during this early period. Because critically important members of the EOC staff—the representatives of essential industries that will continue to operate in the zone—may be less familiar with EOC systems, procedures, and NCP planning in general, a standby EOC operation where they can meet and train an hour or two every day may be justified.

EOC display systems should be reviewed during this phase. A large-scale map should be available to indicate wind patterns and relocation routes. Radiological

report charts and shelter status boards should also be prepared (See Exhibits V-2 and V-3).

Area Level

Direction and Control Functions. Area direction and control roles parallel those of zones, with correspondingly higher emphasis on the dissemination of general advisory EPI (as opposed to site-specific information). The training role will also be greater at the area level, since it must provide training services for its own jurisdictional employees and citizens as well as for zones that may not have in-house training capabilities.

Like zones, area direction and control elements must review their own plans and increase readiness of their own forces. They have an additional responsibility, however, to monitor status of preparations in zones, and to provide assistance to those zones that may need it.

The exercising role is extremely important at the area level. The area direction and control element must assume primary responsibility for crisis relocation exercises that test the ability of zones to execute their CRP and CSP plans in a mutually supportive way. In addition, the area must enhance contacts with neighboring areas and participate in direction and control exercises that test regional plans and systems.

Industrial liaison, and incorporation of essential industry into the direction and control structure, will assume even more importance in the area and region levels. Efforts must be made to involve these representatives in the exercising process and to acquaint them with CSP and CRP strategies. Considerable attention must be given to educating and assisting industrial facilities in protection of machinery and essential supplies; firms should be encourage to begin stocking the plastic sheets, sand, baffling, and other materials needed to reduce damage to critical capital assets.

EOC Requirements. The functions assigned to area direction and control

Exhibit V-2

RADIATION REPORT

UNIT REPORTING	LOCATION	TIME OF REPORT	DOSE RATE OUTSIDE	DOSE RATE INSIDE

Exhibit V-3

SHELTER STATUS - ZONE

SHELTER AND LOCATION	TIME OF REPORT	PLANNED CAPACITY	OCCUPANTS NOW	ENROUTE	SPACES AVAILABLE	COMMENTS

staffs can be performed for the most part from normal work locations by those staff members assigned responsibility for a specific function. The observations made in discussion of the zone EOC are even more relevant for the area. At least once a day, all members of the direction and control element should meet to review progress, report problems, and assign tasks. At the same time, efforts to upgrade the EOC should be started, including plans for provisioning food, water, and medical supplies. EOC shelter spaces should also be increased or improved to insure space for the expanded staff, and communications should be tested regularly. Radio amateurs and citizens band volunteers should be given specific assignments and training in how to perform them; communications exercises involving these groups should be held nightly to familiarize the participants with the radiological, nudet, and other report traffic they will be handling.

Display requirements will increase to insure that shelter loading information can be effectively gathered and compiled. An example of one way to bring this information together at the area level is shown in Exhibit V-4. A display of radiological and nuclear detonation information will also be needed and should be prepared at this stage of the crisis if it has not been done previously; an example is shown in Exhibit V-5. Finally, a map of the jurisdiction to chart meteorological data should be available, and plotters trained in its use.

Regional Level

Direction and Control Functions. At Regional, State, and Federal levels, the basic NCP emergency public information materials will be prepared and disseminated directly to major media and downstream to areas and zones for further distribution.

Regional level direction and control elements will also closely monitor local training and exercising, as well as coordinate and conduct regional level training and exercise activities. Training for regional staffs is particularly important because they are composed of representatives of State agencies that interact much less frequently than area and zone level management groups typically do. During this

Exhibit V-4

SHELTER STATUS - AREA

ZONE	TIME OF REPORTS	NUMBER OF SHELTERS	PLANNED CAPACITY	OCCUPANTS NOW	ENROUTE	SPACES AVAILABLE	COMMENTS

Exhibit V-5

NUDET REPORTS

UNIT REPORTING	LOCATION OF UNIT	DIRECTION OF FLASH	TIME OF DETONATION	REMARKS

phase, regional staffs will have to develop working relationships and understandings that at the zone level are typically developed during the normalcy period. In addition, special training needs may be identified with respect to EOC operations and procedures; regional training and exercising during the normalcy period is much less frequent than at the area and zone level.

Another major role for the region direction and control staff is to review crisis relocation allocations and make adjustments as necessary. Of course, close contact must be maintained with the area entities to insure that revisions and reallocations are transmitted to appropriate levels of the organization.

Finally, a major role of the regional direction and control element is to prepare a regional EOC for operation. If an EOC exists, steps should be taken to improve its protection, communications, and data and display devices. If no EOC yet exists, a facility will have to be chosen and communications, displays, and protection quickly developed. All subordinate direction and control groups should be informed of the location and communications linkages of the new facility as soon as it is designated.

Because regional staffs are likely to be less familiar with EOC operations, and because they have an important role to play in the national backbone system, regional level EOCs should be activated during the early crisis periods. Such activation will give an opportunity to shake down the facility and its crew and provide a chance for area direction and control elements to learn to work with it.

EOC Requirements. The regional EOC should be located well away from risk areas in a location that is accessible and, if possible, central to the region served. The EOC should be so sited as to maximize radio propagation characteristics and minimize susceptibility to lingering fallout—that is, preferably not in a high fallout risk area.

Data and display needs in the regional EOC will be substantial. There must be records of locations, communications links, and resources of all areas and zones in the region. There should be systems to display shelter loading (see Exhibit

V-4, which can be revised to serve regional purposes) and radiological and nuclear detonation reporting (Exhibits V-3 and V-5 can also be adapted). Data should be collected and maintained on essential industries throughout the region and on relocation sites of industrial management cadres. Regional maps should be available in quantity, to plot postattack situations and transportation routes.

The regional EOC should have good fallout protection, and must have secure communications upward to State headquarters and Federal regions, downward to areas, and laterally to other regional EOCs. To the extent possible, redundancy should be built in through the recruitment and use of radio amateurs to back up government radio systems.

Equipment and supplies should be stockpiled in the EOC facility to adequately support sustained EOC operations, not only through the in-shelter period but also well into the postattack period.

Deepening Crisis

Zone Level

Direction and Control Functions. Functions described for the zone direction and control element in the early crisis period will be accelerated as the crisis deepens. Requests for public information may be expected to increase and zone direction and control staffs must be prepared to respond. Special door-to-door campaigns by scout troops or other volunteers may be organized to insure wide distribution of EPI materials. Public information should emphasize the advisability of families setting aside food, water, medical supplies, and bedding in anticipation of a relocation order.

A major new function for direction and control elements at all levels during this phase is to begin watching for signs of spontaneous evacuation and to adjust plans and resources accordingly. The direction and control element should be sensitive to traffic flow statistics on major highways serving the zone; requests to utilities to discontinue services; or utility reports of reduced consumption. If significant shifts

of population out of the zone are found, the direction and control element should alert area and regional staffs.

In risk areas, there will be an added direction and control function during this phase. In anticipation of a relocation order, local police visibility should be increased as an assurance to those who may be reluctant to leave their homes.

EOC Requirements. In host areas, direction and control staffs should begin to use the EOC facility to compile information on inflow; briefings should also be conducted in the FOC for shelter managers so that they understand the purposes of the facility and their own role in providing important data to it. Communications links from the EOC to shelter complexes should be established and protocols developed for the use of the nets. Supplies needed for sustained operation of the facility should be identified, and plans to acquire and store them made.

In risk areas, those EOCs that have not yet been activated should be activated during this period. Protection enhancement activities should continue, and shelter stocks acquired and stored.

Inexpensive microprocessor-based data and display systems, described in Chapter III, can be used to track shelter loading. Exhibit V-6 presents a printout from a $3,000 data processing system.

Area Level

Direction and Control Functions. The monitoring of spontaneous evacuations should also be undertaken at the area level, where aggregate data will be more meaningful than data collected at the zone level. If spontaneous evacuation is substantial, the direction and control element should insure that traffic control systems are in place and road clearing capabilities are in a full state of readiness.

During this deepening crisis phase, State and Federal financial and other assistance for crisis preparedness is likely to become available, and the area will play an important role in setting priorities on where the maximum effort should be placed.

EXHIBIT V-6

PRINTOUT OF SHELTER DATA ON
MICROPROCESSOR SYSTEM

(Page 5)

FACILITY NAME/ADDRESS	MAP ID	DAYS OF FOOD	DAYS OF WATER	SPACES USED	SPACES AVAIL
SEE'S CANDY/210 EL CAM.REAL	23F6	3	2	0	1820
SIMONETTE'S DRAPES/475 GRAND	24B5	0	1	0	230
S.S.F. CITY HALL/400 GRAND	24B5	0	1	0	295
S.S.F. LIBRARY/840 W.ORANGE	23E5	2	14	0	860
TREATMENT PLANT/BELLE AIRE	25C1	4	14	0	60
S.S.F. PUMP STA.3/KIMBALL	24C5	0	1	0	140
S.S.F. PUMP STA.4/251 HARBOR	24C5	0	1	0	40
S.S.F. PUMP STA.9/SAN MATEO	24B6	0	1	0	90
POST OFFICE/322 LINDEN	24B5	5	2	0	295
VALUE GIANT/33 ARROYO	23D5	0	1	500	5400
		61	56	500	13125

PRESS ENTER? ←

**** SUMMARY: CITY SHELTERS NOW CONTAIN 500 PEOPLE
AND ARE 3 PERCENT FILLED. IF SUPPLIES ON HAND
WERE DISTRIBUTED SUITABLY, AN AVERAGE OF 3 DAYS OF
FOOD, AND 2 DAYS OF WATER FOR FULL SHELTERS NOW
EXISTS. IN THAT SOME SHELTEREES WILL HAVE BROUGHT THEIR
OWN SUPPLIES, THE ABOVE FIGURES ARE CONSERVATIVE. *****

ENTER FOLLOWING NUMBERS FOR ACTIVITY DESIRED:
'1' FOR FURTHER REVIEW; '2' FOR NEW ENTRIES; '3' FOR PRINTOUT
'4' FOR OTHER NEARBY SHELTERS? ←

SHELTERS IN NEARBY LOCATIONS

FACILITY NAME/ADDRESS	MAP ID	SPACES
S.F.A'PORT PARK RAMP	26D3	74135
S.F.A'PORT TERMINALS	26D3	14470
S.F.A'PORT UNITED BLDG.74	26C3	2645
S.F.A'PORT UNITED BLDG.15	26C3	24395
	TOTAL	115645

PRESS ENTER? ←

Decisions will have to be made regarding where fallout shelter construction and improvement are most needed, where food and medical supplies should be stockpiled, and where special equipment should be re-positioned. In coordination with the region, area direction and control elements will have to shift competing requests for assistance and apply resources to areas where the most lives and productive capacity can be saved.

Also during this period, the area direction and control staff should make a special effort to test the warning system from its receipt of a NAWAS message through distribution to zones and triggering of zone-based siren and other systems. Such tests should be accompanied by public information campaigns that explain the signal system, describe what actions should be taken, and review community shelter locations and assignments.

EOC Requirements. Area EOCs should be activated during this period, and their personnel should begin to maintain data and display devices that contain information on movement and shelter. Risk area EOCs should have lists of all essential workers and their billeting locations, and should insure that all essential workers know the warning system signals and know the locations of their shelters.

Risk-area EOC staffs should also begin preparing to relocate part of their direction and control cadres to host-area locations, particularly if spontaneous evacuation reaches sizable proportions. At the same time, host or conglomerate EOCs should begin working out arrangements to accommodate relocated direction and control elements from risk areas.

Communications between sister host/risk jurisdictions during this period can best be accomplished by telephone, although radio and other systems should be tested with increasing frequency.

Region Level

Direction and Control Functions. As the crisis deepens, there will be increasing demands for public information from lower echelons and from the public.

There will also be an increasing demand for information from the media, and the region should be prepared to respond to this demand. The monitoring function mentioned above in regard to spontaneous evacuation is especially important at the regional level, for it may require substantial revision of regional population and resource allocations.

Another major new direction and control function for the regional organization at this stage is the coordination of State and Federal assistance to local governments. This function involves both setting priorities for assistance and coordinating the provision of aid.

Finally, the regional direction and control element should be prepared to accommodate the governor and/or his or her staff, if a decision is made at higher levels to relocate the State EOC or disperse part of its staff.

EOC Requirements. Space demands within the EOC facility may considerably escalate during this period. Expansion of the EOC complex will be compelled by a combination of factors: demands for media briefings; participation of representatives of State and Federal agencies involved in providing assistance to local governments in the region; and the possibility that at least some of the State direction and control element may move to the region. This expansion in turn will place increasing burdens on those elements of the EOC staff that are responsible for upgrading the protection capability of the EOC. Equipment, supplies, and furniture to support the larger staff burden will also be needed.

Mobilization

Zone Level

Direction and Control Functions. The decision to either relocate or take shelter in place will, to some extent, ease the burden on direction and control elements at all levels to plan and prepare for either of the two contingencies. Once that decision to relocate is made, a new and more time-critical set of direction and control functions will emerge.

If the decision is made to remain in place, last-minute efforts must concentrate on upgrading shelter spaces, stocking shelters, and informing the public of shelter locations and supplies that should be brought to them. Publicity should also be accelerated on the warning system and the meanings of the various signals. Training in EOC operations and testing of communications equipment should continue. Direction and control elements should encourage shelter managers to organize first aid, rescue, fire fighting, and radiological monitoring classes in the shelter complexes.

If the decision is made to relocate, direction and control roles in host and risk areas diverge sharply. In host areas, direction and control elements should concentrate on moving foodstuffs, medical supplies, and other necessities from above-ground distribution points into shelters. Final training of shelter management teams should take place, as well as training of the reception units that will meet, register, and distribute relocatees.

In risk areas, direction and control elements will concentrate on getting the relocation movement underway and insuring that it is expedited through a combination of public information and traffic control measures. Commuting arrangements for essential workers should be put into effect, and work on upgrading shelters for direct effects protection accelerated.

EOC Requirements. As the decision to either relocate or shelter in place is made, the EOC should be fully activated and a shift schedule arranged. Improvements to protection capabilities should continue to be made. Traffic flows into and out of the zone and registrations at reception centers should be monitored and displayed, then reported to the area over telephone or direction and control radio systems.

Area Level

Direction and Control Functions. Area direction and control elements will bear prime responsibility for the movement of population to host areas. This movement will have to be monitored closely, and regional and adjacent area EOCs will

have to be kept informed of progress and bottlenecks. Area direction and control should also take special steps to protect emergency equipment and supplies through dispersion or hasty sheltering.

Public information remains a major task during this phase. Last-minute instructions on preferred routes, in the case of the relocation option, or on newly developed shelters, in the case of the in-place option, should be disseminated through the EBS.

EOC Requirements. To effectively monitor and control movement to shelter or to relocation areas, the area direction and control staff will need the ability to collect and evaluate information quickly. This requirements will be the first major test of the on-line communications capability. All shelter facilities should report status, and aggregate figures should be reported to the region. Maps of routes should be maintained that indicate bottlenecks, detours, and traffic flows. Improvement of direct effects and fallout protection of the EOC should continue. EOC staffs should be put on operational shift schedules. Contact with adjacent areas should be established and maintained.

Region Level

Direction and Control Functions. Effectiveness of the relocation or movement to shelter operation should be continuously monitored and special problems addressed as they arise. State and Federal resources should be applied and coordinated through the regional center whenever bottlenecks or overloads occur in the movement process.

Planning for information collection and distribution during the in-shelter (attack) period should be refined and all communications and reporting systems tested down to the areas and up to State or Federal regional EOCs.

EOC Requirements. Final protective enhancement of the EOC should be completed. Regional resources that have been dispersed during earlier phases should

be double-checked for final locations, status, and communications capability. Stocking of the EOC for sustained operations should be completed.

VI. IN-SHELTER

Environment

The attack causes a quantum change in the emergency environment. The emergency operating system must respond to real hazards rather than assumed possible future threats, as was the case during the crisis. Thus, the emergency operating system must be a response system and its actions will be dictated by the threats present in the changing situation. The major continuing threats to the survivors of a nuclear weapon detonation will be immediate weapon-caused fires and fallout radiation. In general terms, the area experiencing blast damage and the area experiencing weapon-caused fires are approximately the same. The radius of the area experiencing substantial damage and fires may be 5, 10, or 20 miles, depending on the yield and conditions of the detonation. On the other hand, the area experiencing substantial fallout may extend several hundred miles downwind and be 20, 40, 60 or more miles wide, depending on the wind conditions (Exhibit VI-1).

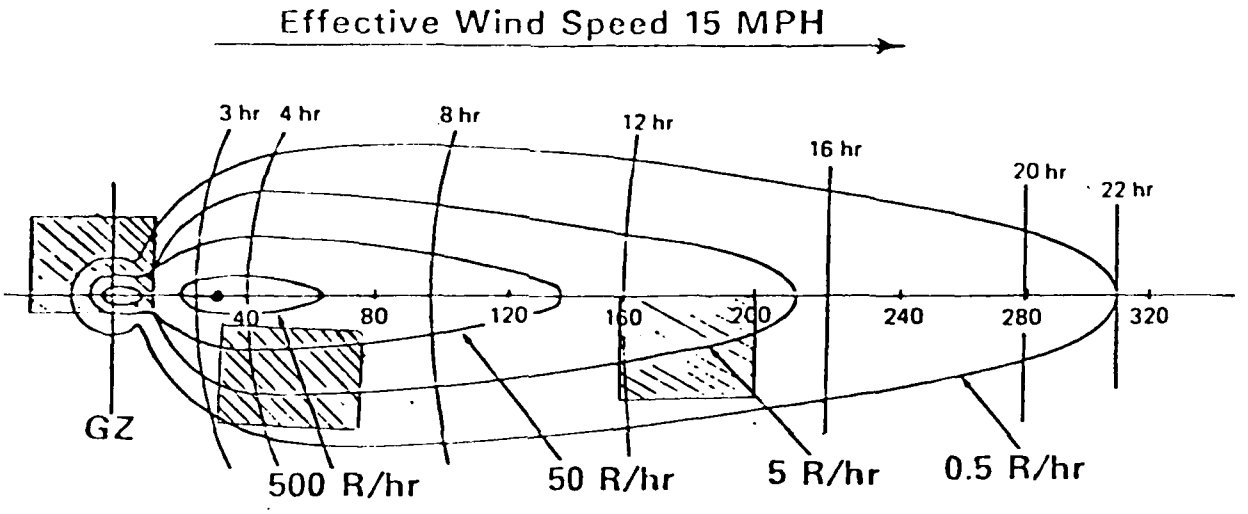
Within the fallout area, the intensity of the fallout hazard will vary considerably from place to place and will change with time. First, as the fallout material is being deposited, the radiation intensity will increase. Then, when no more fallout material is being deposited in a given place, the radiation intensity will decrease because of the radioactive decay process. In the damaged area, the seriousness of the ensuing fires will also vary with distance and time, depending on many factors (distribution of structures, their combustibility, weather conditions, fire spread, success in firefighting, etc.). Thus, the severity of the threat will first increase as individual ignitions flash over and become fires which then may spread and involve larger and larger areas. Then the fire threat will diminish as fires are brought under control or burn themselves out.

The detonation of a nuclear weapon would divide a region into two broadly

Exhibit VI-1

PEAK DOSE-RATE PATTERN

(5 MT Surface Burst)



A typical county (area)

About 1200 sq. mi.

defined areas. One is the **damaged area** within which the major threats are weapon-caused damage and ensuing fires, with or without concurrent fallout radiation. The other is an **undamaged area** which does not experience substantial direct effects but may experience serious fallout. It is in the damaged area that the traditional disaster or emergency functions of search and rescue, first aid, debris clearance, fire fighting, evacuation, and the like are required. Needed support for these emergency operations must come from nearby undamaged areas, or from nearby jurisdictions that have been able to control their fires.

EOC Requirements

In previous chapters, EOC requirements were discussed after an exposition of direction and control functions. This sequence was used because the role that a direction and control element plays determines whether or not an EOC is needed, and if needed, how it should be sited and equipped. During an attack and the immediate postattack period, however, the need for an EOC is dependent, not on direction and control functions, but on whether enough population and economics resources survive to require direction and control. At the zone level in particular, direction and control staff needs only the same protection level as the population it serves. Ensuring that the local direction and control element survives when the population and resources do not is an inappropriate use of scarce resources in the nuclear war context.

With this in mind, general observations about EOC requirements at all levels can be made. First, the local EOC need only be protected to the level of general direct effects or fallout protection in the community it serves. On the other hand, area and regional EOCs (because they may be needed to direct and control postattack operations) will require substantially more protection than the communities in which they are located.

In addition to protection, communications are the second essential for effective accomplishment of direction and control tasks during and after nuclear detonations.

There are two main ways in which communications systems can be interrupted or destroyed in an attack: through physical damage to antennas, repeaters, and base stations, and through electromagnetic pulse. Damage to system components can be repaired if spare parts have been set aside; EMP countermeasures include attenuation, absorption, and shielding. These protective techniques must be designed or retrofitted into the system, however; the only short-term measure that may have some chance of limiting damage is to unplug electronic appliances before the burst. For an EOC to survive as a functioning part of the direction and control system, then, EMP countermeasures must be included in communications system design.

Zone-Level Direction and Control Functions

The first function of direction and control elements during the in-shelter period is to monitor the environment. Reports from remote reporting stations should be consolidated in the EOC, then forwarded to area levels.

The EOC staff also directs emergency response, including fire fighting, rescue, and medical care. The ability to perform this function will depend on the operating situation in the zone—the fire and radiological condition.

It will be important for the zone EOC to develop damage information quickly, so that if the operating situation permits, incipient and developing fires can be suppressed.

The zone direction and control staff, as part of its information gathering function, should attempt to ascertain conditions in neighboring zones, either through direct radio contact, reconnaissance, or report from one of its own shelters at the periphery.

Another major zone direction and control function is to take whatever actions are necessary to sustain life and conserve resources. If operating conditions permit, these actions may include fire fighting, rescue, remedial movement (if a shelter complex is damaged or is threatened by fire), and first aid.

Finally, the EOC staff should review and revise the postattack plans in view of what it has learned about the postattack environment. First aid and rescue training

should continue during this period, and teams should be formed for damage assessment surveys, rescue, decontamination activities, and debris clearance.

Area-Level Direction and Control Functions

Area EOC cadre will be performing the same kinds of tasks as zones during this period. The most important task is gathering as much intelligence as possible about targets, damage, and fallout patterns. Part of this process will entail polling zones and gathering information from area field forces and locations. Negative reports—zones that the area cannot get in touch with—will be informative in their own way, and the earliest reconnaissance units that the area can send out should go to zones that have lost contact. Areas should also look laterally to determine the status of adjacent areas.

The area direction and control element also has the responsibility to combine and evaluate its weapon-effects, radiological, and damage reports, and to forward this information to the region.

To the extent that emergency operations are possible, the area should attempt to assist in fire fighting, rescue, and remedial movement. Establishing priorities for such aid after nuclear attack will be difficult, and the triage approach used in mass casualty situations may have to be applied to zones. For example, zones that are damaged but have potential for quick economic recovery may be sent assistance in precedence over zones where very heavy damage has occurred and little postattack value attaches.

Region-Level Direction and Control Functions

Region direction and control elements will be attempting to develop a coherent picture of the attack from fragmentary reports from areas. The focus of this assessment will be on postattack recovery and the resources it will require. The same triage considerations as discussed above will guide regional direction and control elements in setting resource allocation priorities for the immediate postattack period.

To the extent possible, the region will also provide State agency assistance in remedial movement operations and in containing major conflagrations.

Where communications with areas or with Federal regions are lost, the regional direction and control will attempt to restore them, or establish other communications linkages.

The region will also have the task of refining postattack recovery plans. Included in these plans should be special public information activities covering sanitation, food and food sources, rationing programs, and the like.

VII. POSTATTACK

For purposes of this analysis of postattack direction and control requirements, it is necessary to define the beginning of the postattack period. The postattack period begins when postattack operations are started; that is, when direction and control elements decide that further attack is unlikely and that postattack operations can proceed with or without radiation-dose controls. In different areas with different levels of damage, the postattack period will begin at different times. The discussion below is limited to considerations of direction and control needs during the early stages of the recovery, when short-term "pure countermeasures" are instituted. The discussion does not include the long-term reconstitution of national industry and commerce.

Zone-Level Direction and Control Functions

The basic question to be answered by surviving direction and control elements in the immediate postattack environment is whether people in the zone can be sustained in place, a decision that will be based on damage and radiation levels and on amounts of resources available to sustain the population.

Four cases are presented below and describe the four possible postattack environments in which zones may find themselves. Case 1 is the damaged zone that cannot sustain its population. Case 2 is a relatively undamaged zone that is unsustainable because of radiation or lack of resources. Case 3 is the undamaged zone without appreciable radiation problems but with a depleted resource base. Case 4 is the undamaged zone without appreciable radiation and with adequate resources to sustain its population.

Case 1 is the worst-case zone; the attack has caused substantial damage and fires, and fallout may or may not have occurred. Resources have been destroyed or depleted, or are otherwise unavailable to support the surviving population in the zone. The direction and control functions for such a zone include, first, establishing what

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EOC REQUIREMENTS AT STATE AND LOCAL LEVELS.(U)
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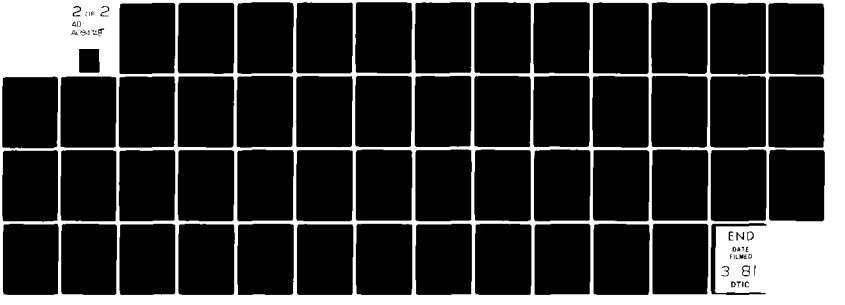

the status of the zone is. This will entail reports from shelters and other dispersed units, dispatch of survey teams, and monitoring of reports from other nearby zones. When radiation levels permit, fires should be fought, rescues attempted, and remedial movement to avoid fire undertaken.

The second major function of the direction and control element in this zone is to determine surviving resource levels and evaluate whether or not the population can be sustained in the zone. If the finding is negative, the area must be informed and requested to assist in remedial movement. Meanwhile, the zone direction and control element must begin organizing its own surviving forces to conduct the remedial movement, and to poll other zones for possible hosting and transportation assistance. In preparation for the movement, egress routes must be reconnoitered and cleared.

Remedial movement is not an all-or-nothing measure; relocation of a portion of the surviving population, such as the injured or non-work force elements, may leave the zone able to sustain itself and capable of coping with fire and radiation problems. In this event, it becomes a Case 2 zone.

A Case 2 zone is relatively undamaged but cannot sustain its population in-place because of radiation or resource depletion. As with all other zones, the direction and control element in Case 2 zones must first establish what its operating situation and resource status are and then devise solutions. When the decision is made that resources are inadequate to sustain population, the direction and control staff must decide to either move part of its population out of the zone, or find and bring in the food, water, and medical supplies needed to sustain survivors. Either option will have to be communicated to the area EOC staff for advice and assistance in determining where to send people or where to find resources.

A Case 3 zone must also first determine what its damage and resource levels are. In this case, the direction and control function will be limited to equitably dividing remaining resources and seeking additional resources from outside the zone.

Remedial movement would be generally ill-advised in this situation; it would divert scarce transportation and human resources for a movement that is not necessary from the point of view of survival. It would also be psychologically unacceptable to a population that had just survived nuclear attack, to suggest that it now leave its home and community.

A Case 4 zone has survived the attack with resources pretty well intact and with little fallout and damage. The direction and control element of this type of zone will be extremely important in moving the country toward recovery, if responsibilities toward other communities are recognized.

The EOC staff must first determine status and then report it to the area. It should then ready emergency services to move into damaged zones to deliver supplies, assist in remedial movement, or assist in fire and rescue activities. Case 4 zone direction and control elements must also organize for shelter emergence of their own population, including the reestablishment of law enforcement patrolling, the repair of utilities, and the clearing of debris. Of most critical importance, however, is the reconstitution of economic activity, and the EOC staff should focus a great deal of its effort on this objective.

Area-Level Direction and Control Functions

The initial phases of the postattack period will be characterized by extreme decentralization of control. Zones will respond autonomously to local problems and will be focused on very short-term, "pure countermeasure" responses (see Reference 20). It will be the task of area and regional levels of the direction and control element to reestablish the hierarchical governmental structure so that rational and coordinated economic recovery can be undertaken. The first step in this process will be the restoration of a functioning direction and control communications net; the first priority of zone direction and control staffs will therefore be to repair or replace damaged communications equiment so that contact with all zones is possible.

As communications are restored and situation reports begin to paint a fuller picture of the extent of damage and levels of surviving resources, the area direction and control staff can turn its attention to the priority task of restoring basic services and utilities that are a requisite for community and industrial recovery. To do this, representatives of water, gas, electric, sanitation, transportation, and other resource-controlling agencies will have to work closely with the area EOC staff to set schedules, timetables, and priorities.

As service is restored, the direction and control element will have to begin organizing the surviving population to restore housing, clear streets, decontaminate, and reopen economic and industrial facilities important to the local economy.

Region-Level Direction and Control Functions

As areas begin to restore basic services and local economic activity, the regional direction and control staff will begin to assess the regional economic situation and resource inventory. It is at this level that short and long term recovery goals, policies, and plans will be hammered out and promulgated; effective communications with all areas in the zone will again play an important part in the process. Human and material resources controlled by regional and State agencies will have to be allocated to priority areas that offer the most hope of quick return to productive capacity.

EOC Requisites in the Postattack Period

At all levels, EOCs will continue to be required to give focus and direction to the monumental tasks of sustaining the surviving population and restoring industrial and commercial activity. Fallout protection will still be required at all these sites, and will now include decontamination and debris clearance procedures so that forces can begin to move freely from the in-shelter posture. The greatest requirement will be for effective communication up and down the direction and control ladder, and telephone and other communications services will have the highest priority for restoration. It may be necessary in this period to relocate the EOC operation to a site

and facility that has better surviving communications capability, or more potential for quick restoration of service.

VIII. ANALYSIS AND ISSUES

In the preceding five chapters, direction and control functions have been generically described in an effort to answer several central questions:

- o Is an EOC really needed? If EOCs did not exist, would we have to invent them in order to perform the tasks required of the crisis management team at zone, area, and regional levels?
- o If EOCS are required, how should they be sited, equipped, and staffed?
- o In the range of emergency situations that may confront the community or nation at any time, what should be done at the EOC, and how should it be done?
- o What supporting EOC resources are needed for effective accomplishment of emergency tasks?

Exhibits VIII-1 and VIII-2 array primary direction and control functions by level and contingency. A high correlation is found between disaster and NCP tasks and functions. Throughout all levels and all contingencies, there is a consistent demand for damage assessment, public information, coordination of mutual aid, and mitigation of disaster (or weapons) effects.

The weakest role definition is for the regional level in disaster contexts. This may be because the regional level is uncommon (only 18 states have regional preparedness agency structures) or, more likely, because regional direction and control staff is widely dispersed and difficult to assemble quickly enough to have a bearing on immediate disaster response.

From the data on Emergency Operating Centers, it is possible to derive an "ideal" location and to rank locational factors in priority order. Exhibit VIII-3 displays this information.

Data and display needs also present a fairly uniform package of requirements. Exhibit VIII-4 summarizes display needs.

Exhibit VIII-1

DISASTER DIRECTION AND CONTROL FUNCTIONS

	DISASTER WITHOUT WARNING	DISASTER WITH WARNING
Region	Assess Damage Broker Mutual Aid Between Areas Coordinate State Agency Response Furnish Special Resources	← Plus: Coordinate Federal and State Mitigation Efforts Monitor Environment Maintain Liaison With NWS, USGS
Area	Assess Damage Respond to Area Problems Set Priorities for Area Response Coordinate Mutual Aid Zone-to-Zone Area-to-Area Federal and State to Area and Zone	← Plus: Inform Public Assist in Evacuation Assist in Mitigation Monitor Environment
Zone	Assess Damage Set Response Priorities Coordinate Mutual Aid	← Plus: Warn the Public Control Evacuation Mitigate Effects Increase Readiness

Exhibit VIII-2

NCP DIRECTION AND CONTROL FUNCTIONS

	CRISIS			IN-SHELTER	POSTATTACK
	Early	Deepening	Mobilization		
REGION	Prepare EPI Train Region Staff Adjust Plans & Allocations Prepare EOC	Provide Info to Media Monitor Spontaneous Relocation Coordinate State Aid Prepare for Relocation	Monitor Movement Adjust Allocations Assist in Shelter Upgrading Test Commo	Assess Damage & Fallout Assist in Remedial Movement Reestablish Commo Revise Recovery Plans Prepare Public Info	Restore Commo Assess Damages & Resources Set Goals, Policies, Priorities Control Resources
AREA	Provide Public Information Review Plans Conduct Training & Exercises Liaison with Industry Protect Assets	Insure Traffic Control Monitor Spontaneous Relocation Set Priorities for State Aid Test Warning	Control Movement Protect Equipment Inform Public	Assess Damage & Fallout Conduct Emergency Operations Keep Region Informed	Restore Commo Assess Damages & Resources Restore Basic Services Clear Debris
ZONE	Improve Plans Increase Public Information Train Emergency Services & Public Conduct Exercises Upgrade Shelter Test Warning	Increase Public Info Monitor Spontaneous Relocation Continue Readiness Activities	Upgrade Shelter Stock EOC & Shelters Continue Training & Tests Start Relocation Commute Essential Workers	Monitor Environment Direct Emergency Response Assess Damage & Fallout Check Other Zones Sustain Population Review Postattack Plans	Assess Damage Sustain or Move Fight Fires Monitor Environment Report to Area Clear Debris Restore Utilities

Exhibit VIII-3

"IDEAL" EOC LOCATION

Not in Risk Area

Not in Flood Plain

Not in Dam Inundation Area

Not on Fault Line

Not in Central City (conflagration danger)

At or Near Administrative Headquarters

In Strongly Constructed Building with Fallout or Direct Effects Protection

In Good Position for Radio Frequency Propagation

At or Near Centroid of Area Served

Multiple Access and Egress

In Easily Secured Building

In Expandable Spaces

Exhibit VIII-4

EOC DISPLAY NEEDS

Problem Log

Map of Jurisdiction

- Risk Areas
- Flood Plains
- Dam Inundation Areas
- Fault Lines
- Evacuation Routes
- Schools
- Hospitals
- Fire and Police Stations
- Convalescent Homes
- PDH and FAS Locations
- Designated Mass Care Centers
- Designated Multipurpose Staging Areas

Damage Assessment Chart

Mutual Aid Status Charts

Facility Loading Charts

Map of Area

- Relocation Areas and Routes
- Wind Pattern
- Traffic Control Points
- Essential Industries and Associated Shelters

Nuclear Detonation Chart

Radiation Dose-Rate Chart

While high congruity at zone and area levels was found between disaster and NCP direction and control functions and facility requirements, the need for a strong regional node in the direction and control chain is clear. If such a nationwide capability were developed for the nuclear emergency, it would also perform increasingly important functions in natural and other peacetime disasters. The regional direction and control point could make a special contribution in the area of mitigation, a subject of growing importance in the national emergency management system.

The following two chapters focus on the regional issue and several complementary approaches to developing a capability at that level.

PART TWO—DIRECTION AND CONTROL NEEDS AT THE SUB-STATE LEVEL

IX. ALTERNATIVE APPROACHES TO BACKBONE EOCs

X. SUMMARY AND CONCLUSIONS

IX. ALTERNATIVE APPROACHES

In Part One, regional or sub-State direction and control functions and EOC physical and human requirements were discussed in each of the postulated operating situations. The need for such an intermediate level of control was demonstrated in both peacetime and nuclear threat contexts, but was found to be particularly essential during nuclear civil protection phases. The vulnerability of State EOCs to enemy attack (DCPA estimates that 33 will not survive; of the 17 surviving, 8 are in risk areas and may be subject to collateral damage and destruction of critical communications systems) makes this issue of regional EOCs one of critical importance in improving national survival capabilities. Development of protected sub-State EOCs is thus the first construction priority in the D Prime program.

Three possible approaches to providing the sub-State level of direction and control are presented in this chapter. In Reference 5, a Multiple, Integrated, Distributive, Adaptive System (MIDAS) is proposed and schematically described for the States of Ohio and New Mexico. A second approach, a Relocation Area Operating Center (RAOC), is outlined and examined in Reference 6.

This chapter reviews and summarizes the MIDAS and RAOC concepts and proposes a third approach — a system built on upgrading already existing State highway department district facilities. Some combination of the three proposals may prove to be the best approach to the sub-State EOC problem.

MIDAS Concept

The sub-State or State Area EOCs proposed in the MIDAS concept would have two primary functions: operating as a direction and control node in the national backbone system; and serving as alternate State EOC if required, either by attack

damage or vulnerability or from considerations of protecting State direction and control elements by moving or dispersing them. The State Area EOC may also be delegated management responsibilities for one or more conglomerates or coordinating responsibility for several hosting jurisdictions.

In topographically level Ohio, State Area EOCs were sited primarily on the basis of VHF radio propagation characteristics and avoidance of TR-82 risk areas. In the schematic developed for New Mexico, mountainous terrain required addition of repeater sites to insure radio communication.

Space requirements in the DCPA study were set at 2,000 square feet for most State Area EOCs, unless the EOC was to be collocated with a local government EOC operation, in which case 4,000 square feet would be allotted. These EOCs would be constructed with full Federal funding to a protection factor of 100. Communications equipment requirements have been developed and are reproduced in Exhibit IX-1.

The MIDAS concept proposed a staffing level of 25 to 30 persons in the State Area EOCs; the limiting constraint was the 2,000 square foot size of the facility.

An alternative to permanent construction of an operating control node was the hermit crab concept—that is, a 2,000 square foot shell with PF 100 protection and lifeline hookups would be constructed, into which a State communications van could be driven during the crisis period.

RAOC Concept

Reference 6 addressed questions of host area management and postulated a Relocation Area Operating Center to exercise direction and control authority at the regional level during NCP emergencies. The study proposed designation of several hundred relocation areas nationwide, based on risk/host conglomerate and economic trading area considerations. A Relocation Area Operating Center would then be established for each area.

Control of the RAOC would be through State representatives (if the relocation area were wholly within the confines of one State) or Federal representatives (if the

Exhibit IX-1

BACKBONE FACILITY BASIC COMMUNICATIONS

Local and State Communications essential to a National System of Direction and Control.

1. RACES Transceiver (HF)
2. RACES Transceiver (2m)
3. RACES Transceiver (UHF)
4. CB Transceiver (class D-AM, SSB)
5. Programmable Scanning Receiver (32-512 MHz)
6. Facsimile Terminal (FD, Automatic Feed, Analog)
7. Synthesized Public Safety Transceiver (VHF-Hi band)
8. Public Safety Transceiver (UHF)

A remote pickup unit (RPU) is a part of the communications package. However, it is not shown here because it is provided in the D-Prime program estimates under the Broadcast Station Protection Program.

relocation area overlapped two or more States). Staff for the RAOC would include representatives from all relocation area jurisdictions and essential industrial organizations, as well as the basic complement of State or Federal officials. The RAOC would be located in a protected facility outside of the risk area, preferably near the population and transportation centroid of the relocation area.

Precedent for such a regional concept was found in metropolitan and regional transportation, planning, and environmental agencies. By bringing host-area and risk-area direction and control elements into a State or Federally controlled operating center, the RAOC concept would avoid several managerial problems illuminated by the research. The limited capacity for managing a large multijurisdictional crisis effort by a typically small and relatively unsophisticated host area government would be overcome by assigning direction and control to State or Federal officials. The use of well-equipped, trained, and organized risk area organizations as fillers for host area emergency organizations would be averted; under the RAOC concept, risk area agencies would be tasked by the RAOC and continue to operate as integral units. With control of the RAOC in State or Federal hands, questions of authority would be resolved and resource allocation activities of day-to-day government easily absorbed by the new configuration. Finally, important public information efforts would be conducted and advisories promulgated by a State or Federal staff with considerable expertise and resources in the field.

The study concluded with the observation that establishment of the RAOC system would be improbable without the impetus of a nuclear crisis because of local resistance and manpower and resource shortages. Nevertheless, it proposed further study of the concept by DCPA, and indicated several preparatory steps, including surveys of potential RAOC sites, identification of potential staffs, and limited training activities.

This short summary of the RAOC concept does not do justice to the treatment in the referenced study, but is designed to touch only those points relevant to the

backbone EOC concept. It is anticipated that field tests of this Flexible EOC project and of the RAOC study will be conducted together so that useful synergies can be extracted.

State Highway Department Concept

All State highway departments except Rhode Island's have statewide district systems which effectively disperse engineering and maintenance manpower and equipment. This in-place system may provide a cost-effective way to meet most of the D Prime sub-State EOC requirement.

If a decision were made to house sub-State EOCs in highway department district facilities, the following advantages would be of significance in meeting NCP direction and control needs, and serve peacetime disaster purposes as well:

- Highway department districts are State owned; employees located there are under the Governor's control. The issues raised in the RAOC report (Reference 18) regarding possible host/risk direction and control tensions may be mitigated by siting conglomerate EOCs in State facilities that are neutral 'turf,' and where State employees, speaking with the authority of the Governor, can resolve host/risk area disputes.
- Many district facilities are located away from risk areas; 47 States have at least one district office in areas assumed to be untargetted. Districts are generally well-distributed geographically throughout each State in order to fulfill the primary mission of highway maintenance and construction.
- Most highway departments and districts are tied to statewide communications systems that provide communication capability to State headquarters, to other districts, and to mobile equipment.
- Districts have in their immediate control quantities of trucks and heavy equipment that would be necessary in rapidly enhancing fallout shelter

capabilities during the crisis period. Most district engineers also possess delegated authority to contract with local private sector construction resources.

- o Districts are frequently collocated with State police units, which could provide additional security, manpower, communications, and vehicular support to a sub-State EOC.
- o District facilities are typically sited on major highways near the centroid of the district served and with good road access. Many have large yards that could be used for helicopter operations.
- o District facilities commonly are large structures that include a number of parking bays suitable for housing the communications van of the 'hermit crab' concept. The facilities also frequently contain substantial vehicle maintenance areas and stores of petroleum products in quantity.
- o Many district facilities are located on large plots of State-owned ground that may be available for construction of concrete arches, hasty fallout shelters, or other crisis structures.
- o Many States assign hazardous-material spill responsibilities to State highway departments and provide training and protective gear to employees; radiological defense capabilities could easily be integrated into the ongoing training and equipping programs. State highway department employees could also provide a core group of trainers to assist local governments in the area to rapidly upgrade their own radiological defense programs. Many district facilities have training rooms and equipment on site.

Appendix A provides a listing of State highway department districts culled from two American Association of State Highway and Transportation Officials (AASHTO) publications (References 7 and 8). Direct effects and fallout, direct effects, and

fallout designations were drawn from DCPA Technical Report 82, High Risk Areas, April 1978 (Reference 9). Data from Appendix A are summarized in Exhibit IX-2.

The 1978 DCPA in-house study of the backbone system (Reference 5) identified State EOCs unlikely to survive a mid 1980s attack. Exhibit IX-3 shows that all but two of these States have highway district facilities located in nonrisk areas. The DCPA study also listed eight States whose primary EOCs would probably survive but would be unable to exercise direction and control because of damage to communications systems. Exhibit IX-4 indicates that all of these States have at least one highway district facility remote from risk areas.

The potential usefulness of this approach to developing a sub-State direction and control capability needs further research and evaluation. How are highway district facilities typically configured? Do they commonly include excess space that can be remodelled or quickly converted to EOC use? What hasty measures can be used to improve protection factors, and what time and resource requirements will be involved in such rapid enhancement? How do State highway officials react to the idea, and what levels of support can be expected from them? How would such a system interface with those State civil defense agencies that already have regional structures and EOCs?

In the following chapter, the three alternatives described above will be further compared and several conclusions will be offered.

Exhibit IX-2

SUMMARY OF STATE HIGHWAY DISTRICT VULNERABILITY

STATE	NUMBER OF DISTRICTS OR DIVISIONS	DIRECT EFFECTS AND FALLOUT	DIRECT EFFECTS	FALLOUT	NOT IN RISK AREA
Alabama	9	0	5	0	4
Alaska	5	0	2	0	3
Arizona	7	1	1	0	5
Arkansas	10	1	1	1	7
California	11	2	5	0	4
Colorado	6	0	4	0	2
Connecticut	4	2	0	1	1
Delaware	3	2	0	0	1
Florida	6	0	2	0	4
Georgia	7	0	1	0	6
Hawaii	4	0	1	0	3
Idaho	6	0	1	0	5
Illinois	9	1	2	1	5
Indiana	6	0	2	0	4
Iowa	6	0	2	0	4
Kansas	6	0	2	0	4
Kentucky	12	0	4	0	8
Louisiana	9	0	7	0	2
Maine	7	0	2	0	5
Maryland	7	2	3	1	1
* Massachusetts	8	4	3	1	0
Michigan	10	1	5	0	4
Minnesota	9	2	2	0	5
Mississippi	6	0	0	0	6
Missouri	10	1	3	0	6
Montana	11	0	5	0	6
Nebraska	8	0	2	1	5
Nevada	6	0	2	0	4
New Hampshire	7	1	0	0	6
* New Jersey	4	3	0	1	0
New Mexico	5	0	2	0	3
New York	10	1	5	0	4
North Carolina	13	0	6	0	7
North Dakota	8	0	4	0	4
Ohio	12	2	1	0	9

Exhibit IX-2 (Concluded)

Oklahoma	8	0	1	0	7
Oregon	5	1	1	0	3
Pennsylvania	11	1	5	1	4
* Rhode Island	1	1	0	0	0
South Carolina	7	0	3	0	4
South Dakota	5	0	1	0	4
Tennessee	4	0	3	0	1
Texas	25	2	15	0	8
Utah	6	0	3	0	3
Vermont	9	0	1	0	8
Virginia	8	0	5	0	3
Washington	6	1	2	0	3
West Virginia	10	0	2	0	8
Wisconsin	9	0	7	0	2
Wyoming	5	0	1	0	4
TOTAL					
50	386	32	137	8	209

SUMMARY

3 States do not have any districts not in risk areas

47 States have at least one district not in risk area
43 States have at least two districts not in risk areas
40 States have at least three districts not in risk areas
33 States have more than three districts not in risk areas

Source: Reference 5

* State capitals not at risk, but no protected EOC.

Exhibit IX-3

SURVIVAL OF STATE EOCs VERSUS HIGHWAY DISTRICTS

Non-Surviving State EOCs	Districts Not in Risk Area
Connecticut	1
New Hampshire*	6
New Jersey	0
Rhode Island	0
Vermont*	8
Delaware	1
Pennsylvania	4
Virginia	3
West Virginia	8
Alabama	4
Florida	4
Georgia	6
Mississippi	6
North Carolina	7
South Carolina	4
Tennessee	1
Illinois	5
Indiana	4
Michigan	4
Minnesota	5
Ohio	9
Wisconsin	2
Arkansas	7
Louisiana	2
Iowa	4
Montana	6
Utah	3
Wyoming	4
Arizona	5
California	4
Idaho	5
Oregon	3
Washington	3

Summary:

Two states (New Jersey and Rhode Island) with non-surviving State EOCs have no highway district offices outside the risk area.

Three states (Connecticut, Delaware, Tennessee) with non-surviving State EOCs have only one highway district office outside the risk area.

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*State capitals not at risk, but no protected EOC.

Source: Reference 5

Exhibit IX-4

STATES WITH COMMUNICATIONS LOSS IN EOCs

Survivable State EOCs: Loss of Communications	Districts Not in Risk Area
New York	4
Maryland	1
Oklahoma	7
Texas	8
Colorado	2
Kansas	4
Nebraska	5
Hawaii	3

Source: Reference 5

X. SUMMARY AND CONCLUSIONS

Part One of this report reviewed direction and control roles and EOC requirements at three generally defined levels and identified important considerations in locating, equipping, and staffing direction and control nodes. Regional (or sub-State, or State Area) EOCs were found to be of special importance in nuclear civil protection operations. In Part Two, three approaches to providing this regional level of direction and control were reviewed: MIDAS, RAOC, and State highway district system.

In this chapter, the correlations between the MIDAS and highway district concepts and the RAOC and highway district concepts are further explored. Future research opportunities are also identified and the semantic problem of naming the sub-State level is briefly discussed.

MIDAS/Highway District Correlation

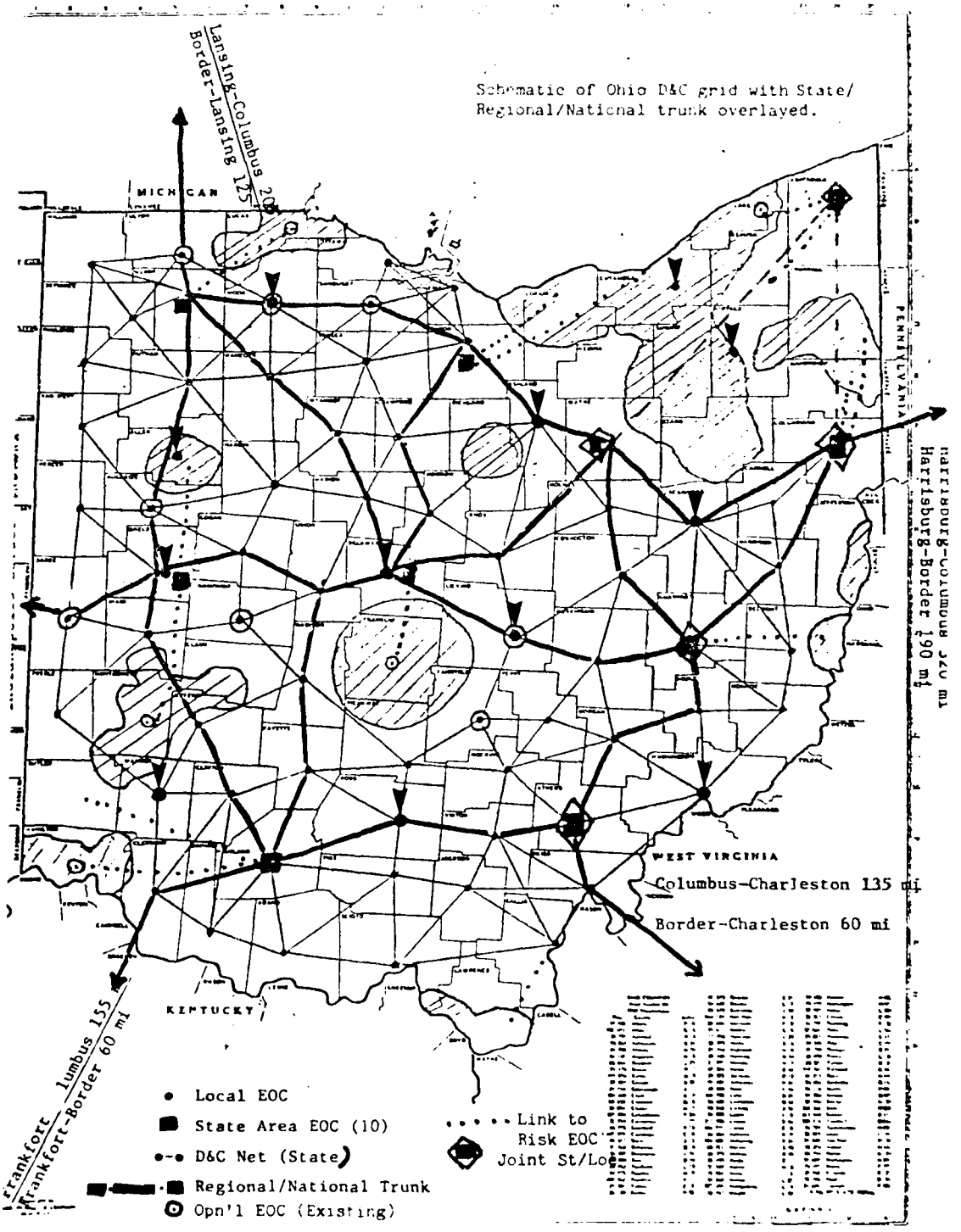
Reference 5, which presents the MIDAS backbone concept, also describes a desk study of its feasibility, conducted using the states of Ohio and New Mexico. How does the MIDAS concept correlate with the State highway district of direction and control nodes? In the 32 States without sub-State emergency preparedness structures, can highway districts fill the role envisaged in MIDAS and meet the design constraints of the MIDAS model?

Apart from dispersion and siting in nonrisk areas, the MIDAS system design observed one primary constraint: sub-State nodes could be located no more than 60 miles from adjacent nodes, and preferably at 40 mile intervals. This constraint recognized the propagation characteristics of VHF radio systems.

Exhibit X-1 (reprinted from Reference 5) presents a schematic representation of a hypothetical direction and control net in Ohio. To evaluate compatibilities between the MIDAS and highway district concepts, Ohio's highway district locations are indicated on the exhibit with down-pointing arrows. In several cases, locations arbitrarily chosen

EXHIBIT X-1

SCHEMATIC OF OHIO D & C GRID



to demonstrate the MIDAS scheme fall on actual sites of State highway districts. All district locations (excepting Garfield Heights and Ravenna, both lying within the Cleveland risk area) are along segments of the hypothetical regional/national and State direction and control nets.

Several of the highway district links, however, exceed the 60 mile distance constraint. Repeaters could solve this problem, and may already exist. Pending an evaluation of actual State highway department communications systems, it cannot be said with confidence that the highway department model satisfies the criteria set forth in the DCPA backbone concept paper. Nevertheless, there is enough correlation to justify further investigation.

RAOC/Highway District Correlation

The RAOC report (Reference 6) focused on crisis relocation management and organizational issues and did not specifically address questions of where control nodes would be sited and how they would be equipped. Several conclusions in the RAOC report do have implications for, and correlations with, a backbone system based on State highway department districts. Relevant conclusions are paraphrased below, and underlined, and these are followed by observations on their impact on a highway district system.

- o <u>There should be a capability to sustain the relocation posture indefinitely</u>. Highway districts provide facilities, manpower, equipment, and supplies that can support sustained direction and control activities.
- o <u>Host-area management is dependent on higher echelon organization</u>. The highway district system is part of the State executive structure.
- o <u>Present organizational systems, rather than new constructs, should manage crisis relocation activities</u>. Highway districts are part of an ongoing widely recognized and respected line organization.

- o Capacity (workload constraints), capability (ability, knowledge, and experience), and communications are the key elements of a crisis-oriented management system. Routine highway design, construction, and maintenance activities can be deferred, freeing district personnel to perform NCP missions. The district engineer has special competence in traffic analysis and flows; his staff is skilled in earthmoving, construction, and contract administration. Most district facilities are linked to State communications systems.
- o For effective crisis management, authoritative decisions need to be distributed down and feedback returned from local to regional and State levels. Communications links to local government facilities in highway districts need further evaluation; sampling suggests that formal communications ties are weak and unstructured.
- o The ability of a typical host-area direction and control element to manage crisis activities of its own and relocated populations and governments is weak. Highway district engineers are highly trained professional managers familiar with large-scale project management.
- o Fallout shelter upgrading and construction should be managed by a regional level direction and control agency. Highway districts are regions and have special competence and resources in the construction field.
- o Higher level management personnel should be dispersed to insure continuity of State government. Highway district-based EOCs provide several options for relocating centralized State direction and control or dispersing it to several locations. The chain of control down to the local level may be broken, however, if district communications to local governments are limited.

It appears from the above analysis that highway districts provide a usable framework of State-controlled facilities, managerial talent, and communications to

which the management concepts developed in Reference 6 can be fitted. With the possible exception of links to local government direction and control nodes, a highway district-based system satisfies most of the key requirements of the RAOC concept. Highway districts are particularly attractive as potential direction and control loci because of their good geographical dispersion, easily convertible work spaces and bays, on-line communications systems, and trained professional staff.

Research Opportunities

The State highway district concept has been developed by analyzing data in References 7 and 8 and by correlating these data with risk designations drawn from Reference 9. Input from an unpublished paper (Reference 10) and from a meeting of the project staff and DCPA officials also contributed to the conceptual effort. A number of questions and issues require further investigation and elaboration, before concrete decisions can be made on the highway district concept. Several topics of future inquiry are suggested below.

- o Capability Assessment
  - What is the size and configuration of a typical district facility?
  - What would be required to convert it to a sub-State direction and control node?
  - What amounts and types of equipment, materials, and tools are commonly kept at districts?
  - What is the usual staff composition and size of a district operation?
  - What communications links exist to state capitals and especially to local government crisis centers?
  - What proportion of highway district facilities nationwide have shelter spaces, and how many are there?
- o Reaction Testing
  - What does the American Association of State Highway and Transportation

Officials think of this concept, and what additional advice, information, and support can it provide?

- How does the National Governors Association, and particularly its comprehensive emergency management staff, react to the idea?
- What do FEMA divisions have to say about the proposal, and what is their evaluation of its fit with natural disaster response and mitigation programs and plans?
- How do State civil defense directors feel about the concept, and what is the best interface of such an approach with the sub-State system already in place in 18 States?

o Peacetime Disaster Applications

- Could such a highway district sub-State system provide valuable assistance in disaster direction and control, evacuation support, short-term mitigation, and debris clearance?
- What would be the proper authority and coordination relationships between highway districts, State preparedness agencies, and State military forces?

o Concept Implementation

- What would be required to bring the program into being?
- What additional communications, construction, and renovation are needed, and what are the costs and time frames?
- Is 100% Federal funding required for upgrading, or will States be willing to match costs because of collateral day-to-day benefits?

o Rapid Enhancement

- If a crisis were to begin tomorrow, what steps could be taken to build on current facilities and resources?
- What engineering actions are necessary to provide adequate fallout shelter spaces and to strengthen communications linkages?

Semantics

Whatever approach is selected to implement the backbone sytem, the sub-State level direction and control node will have to be given an acceptable and appropriate name. The name selected should:

- o Be acceptable to State and local governments.
- o Be descriptive of the functions to be performed and the hierarchical level of the center.
- o Emphasize the coordinated Federal-State-local nature of the preparedness program.
- o Avoid complicated acronyms.
- o Avoid confusion with terms already in use in preparedness and other fields.
- o Be flexible enough to encompass additional roles that may be assigned to the sub-State level.

With these considerations in mind, four candidate terms currently under discussion can be reviewed.

1. State Area and Sub-State Area

The emphasis on State control, while realistic, may exacerbate latent State/local tensions. More importantly, the use of the word may lead to confusion with "Operational Areas," a term that has been used in civil defense for some time and that describes a county-level organizational structure.

2. Conglomerate Area

Conglomerate evokes a connotation of hodge-podge and confusion. While descriptive in the NCP context, the term says nothing about potential regional roles in non-nuclear emergency activities.

3. Relocation Area Operating Center

Again, the use of this term would be limited to the NCP program.

4. Mutual Aid Region

This term is used to identify the sub-State level in California. The use of the word "region" could lead to confusion with the Federal regional structure; on the other hand, "region" has wide acceptance as a descriptive term for the first subdivision of a large geographic area. The positive connotations of mutual aid, which emphasizes coordinated efforts and sharing of resources and responsibilities, has made this a popular term with local government levels wherever it is used.

Summary

A concept of capitalizing on existing State highway department assets—facilities, equipment, manpower, and communications—has been presented. The concept has been tested against two other models and found to be basically compatible. Further research appears justified.

In conclusion, much of the activity in the crisis period requires engineering-type skills and technical managerial talent. From the allocation process through movement analysis and control, from the construction of detours and hasty fallout protection through the administration of contracts with private engineering firms, the State highway district meets many of the major criteria for the skills and expertise required in the crisis period.

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Appendix A

HIGHWAY DISTRICT LOCATIONS AND VULNERABILITIES

STATE	DISTRICT OR DIVISION LOCATION	DIRECT EFFECTS AND FALLOUT	DIRECT EFFECTS	FALLOUT	NOT IN RISK AREA
ALABAMA	Decatur				x
	Sheffield		x		
	Birmingham		x		
	Alexander City				x
	Tuscaloosa		x		
	Montgomery		x		
	Troy				x
	Grove Hill				x
	Mobile		x		
Totals	9	0	5	0	4
ALASKA	Anchorage (Central)		x		
	Juneau (Southeast)				x
	Nome (Western)				x
	Fairbanks (Interior)		x		
	Valdez (South Central)				x
Totals	5	0	2	0	3
ARIZONA	Phoenix		x		
	Tucson	x			
	Safford				x
	Holbrook				x
	Flagstaff				x
	Prescott				x
	Globe				x
Totals	7	1	1	0	5
ARKANSAS	Wynne				x
	Pine Bluff			x	
	Hope				x
	Fort Smith		x		
	Batesville				x
	Little Rock	x			
	Camden				x
	Russellville				x
	Harrison				x
	Paragould				x
Totals	10	1	1	1	7

STATE	DISTRICT OR DIVISION LOCATION	DIRECT EFFECTS AND FALLOUT	DIRECT EFFECTS	FALLOUT	NOT IN RISK AREA
CALIFORNIA	1- Eureka				x
	2- Redding				x
	3- Marysville		x		
	4- San Francisco		x		
	5- San Luis Obispo				x
	6- Fresno		x		
	7- Los Angeles	x			
	8- San Bernadino		x		
	9- Bishop				x
	10- Stockton		x		
	11- San Diego	x			
Totals	11	2	5	0	4
COLORADO	Denver		x		
	Pueblo		x		
	Grand Junction				x
	Greeley		x		
	Durango				x
	Denver Urban		x		
Totals	6	0	4	0	2
CONNECTICUT	1- Rocky Hill	x			
	2- Norwich			x	
	3- New Haven	x			
	4- New Milford				x
Totals	4	2	0	1	1
DELAWARE	Bear (North)	x			
	Dover (Central)	x			
	Georgetown (South)				x
Totals	3	2	0	0	1
FLORIDA	Bartow				x
	Lake City				x
	Chipley				x
	Fort Lauderdale		x		
	De Land				x
	Miami		x		
Totals	6	0	2	0	4

STATE	DISTRICT OR DIVISION LOCATION	DIRECT EFFECTS AND FALLOUT	DIRECT EFFECTS	FALLOUT	NOT IN RISK AREA
GEORGIA	1- Gainesville				x
	2- Tennille				x
	3- Thomaston				x
	4- Tifton				x
	5- Jesup				x
	6- Cartersville				x
	7- Atlanta		x		
Totals	7	0	1	0	6
HAWAII	Oahu		x		
	Kauai				x
	Maui				x
	Hawaii				x
Totals	4	0	1	0	3
IDAHO	1- Pocatello				x
	2- Shoshone				x
	3- Boise		x		
	4- Lewiston				x
	5- Coeur d'Alene				x
	6- Rigby				x
Totals	6	0	1	0	5
ILLINOIS	1- Schaumburg			x	
	2- Dixon				x
	3- Ottawa				x
	4- Peoria		x		
	5- Paris				x
	6- Springfield		x		
	7- Effingham				x
	8- Fairview Heights	x			
	9- Carbondale				x
Totals	9	1	2	1	5

STATE	DISTRICT OR DIVISION LOCATION	DIRECT EFFECTS AND FALLOUT	DIRECT EFFECTS	FALLOUT	NOT IN RISK AREA
INDIANA	Crawfordsville				x
	Fort Wayne		x		
	Greenfield		x		
	La Porte				x
	Seymour				x
	Vincennes				x
Totals	6	0	2	0	4
IOWA	1- Ames				x
	2- Mason City				x
	3- Sioux City		x		
	4- Atlantic				x
	5- Fairfield				x
	6- Cedar Rapids		x		
Totals	6	0	2	0	4
KANSAS	1- Topeka		x		
	2- Salina		x		
	3- Norton				x
	4- Chanute				x
	5- Hutchinson				x
	6- Garden City				x
Totals	6	0	2	0	4
KENTUCKY	1- Paducah		x		
	2- Madisonville				x
	3- Bowling Green				x
	4- Elizabethtown				x
	5- Louisville		x		
	6- Covington		x		
	7- Lexington		x		
	8- Somerset				x
	9- Flemingsburg				x
	10- Jackson				x
	11- Manchester				x
	12- Pikeville				x
Totals	12	0	4	0	8

STATE	DISTRICT OR DIVISION LOCATION	DIRECT EFFECTS AND FALLOUT	DIRECT EFFECTS	FALLOUT	NOT IN RISK AREA
LOUISIANA	Bridge City		x		
	Lafayette		x		
	Shreveport		x		
	Monroe		x		
	Chase				x
	Baton Rouge		x		
	Hammond				x
	Lake Charles		x		
	Alexandria		x		
Totals	9	0	7	0	2
MAINE	1- Preque Isle				x
	2- Ellsworth				x
	3- Bangor		x		
	4- Fairfield				x
	5- Rockland				x
	6- Scarborough		x		
	7- Dixfield				x
Totals	7	0	2	0	5
MARYLAND	Salisbury				x
	Chesterton			x	
	Greenbelt	x			
	Brooklandville	x			
	Prince Frederick		x		
	Cumberland		x		
	Frederick		x		
Totals	7	2	3	1	1
MASSACHUSETTS	1- Lenox		x		
	2- Northhampton		x		
	3- Worcester	x			
	4- Arlington	x			
	5- Hathorne	x			
	6- Taunton	x			
	7- Middleborough			x	
	8- South Boston		x		
Totals	8	4	3	1	0

STATE	DISTRICT OR DIVISION LOCATION	DIRECT EFFECTS AND FALLOUT	DIRECT EFFECTS	FALLOUT	NOT IN RISK AREA
MICHIGAN	1- Crystal Falls				x
	Escanaba (office only)		x		
	2- Newberry				x
	3- Cadillac				x
	4- Elmira				x
	5- Grand Rapids		x		
	6- Saginaw		x		
	7- Kalamazoo		x		
	8- Jackson		x		
	9- Southfield	x			
Totals	10	1	5	0	4
MINNESOTA	1- Duluth		x		
	2- Bemidji				x
	3- Brainerd				x
	4- Detroit Lakes				x
	5- Golden Valley	x			
	6- Rochester		x		
	7- Mankato				x
	8- Willmar				x
	9- North St. Paul	x			
Totals	9	2	2	0	5
MISSISSIPPI	Tupelo				x
	Batesville				x
	Yazoo City				x
	Newton				x
	Hattiesburg				x
	McComb				x
Totals	6	0	0	0	6
MISSOURI	St. Joseph		x		
	Macon				x
	Hannibal				x
	Kansas City	x			
	Jefferson City				x
	Kirkwood		x		
	Joplin				x
	Springfield		x		
	Willow Springs				x
	Sikeston				x
Totals	10	1	3	0	6

STATE	DISTRICT OR DIVISION LOCATION	DIRECT EFFECTS AND FALLOUT	DIRECT EFFECTS	FALLOUT	NOT IN RISK AREA
MONTANA	Missoula		x		
	Kalispell				x
	Butte		x		
	Bozeman				x
	Great Falls		x		
	Havre				x
	Glendive				x
	Wolf Point				x
	Billings		x		
	Miles City				x
	Lewistown		x		
Totals	11	0	5	0	6
NEBRASKA	I Lincoln		x		
	II Omaha		x		
	III Norfolk				x
	IV Grand Island				x
	V Bridgeport			x	
	VI North Platte				x
	VII McCook				x
	VIII Ainsworth				x
Totals	8	0	2	1	5
NEVADA	1- Las Vegas		x		
	2- Reno		x		
	3- Elko				x
	4- East Ely				x
	5- Tonopah				x
	6- Winnemucca				x
Totals	6	0	2	0	4
NEW HAMPSHIRE	I Lancaster				x
	II Twin Mountain				x
	III Laconia				x
	IV Lebanon				x
	V Hooksett				x
	VI Portsmouth	x			
	VII Keene				x
Totals	7	1	0	0	6

STATE	DISTRICT OR DIVISION LOCATION	DIRECT EFFECTS AND FALLOUT	DIRECT EFFECTS	FALLOUT	NOT IN RISK AREA
NEW JERSEY	Somerville			x	
	Newark	x			
	East Brunswick	x			
	Haddonfield	x			
Totals	4	3	0	1	0
NEW MEXICO	I Deming				x
	II Roswell		x		
	III Albuquerque		x		
	IV Las Vegas				x
	V Santa Fe				x
Totals	5	0	2	0	3
NEW YORK	Albany		x		
	Utica		x		
	Syracuse		x		
	Rochester		x		
	Buffalo		x		
	Hornell				x
	Watertown				x
	Poughkeepsie				x
	Binghamton				x
	Hauppauge	x			
Totals	10	1	5	0	4
NORTH CAROLINA	Ahoskie				x
	Greenville				x
	Wilmington		x		
	Wilson				x
	Durham		x		
	Fayetteville		x		
	Greensboro		x		
	Aberdeen				x
	Winston-Salem		x		
	North Wilkesboro				x
	Shelby				x
	Asheville		x		
	Sylva				x
Totals	13	0	6	0	7

STATE	DISTRICT OR DIVISION LOCATION	DIRECT EFFECTS AND FALLOUT	DIRECT EFFECTS	FALLOUT	NOT IN RISK AREA
NORTH DAKOTA	Bismarck				x
	Devils Lake		x		
	Dickinson				x
	Fargo		x		
	Grand Forks		x		
	Minot				x
	Valley City		x		
	Williston				x
Totals	8	0	4	0	4
OHIO	1- Lima		x		
	2- Bowling Green				x
	3- Ashland				x
	4- Ravenna	x			
	5- Newark				x
	6- Delaware				x
	7- Sidney				x
	8- *Lebanon*				x
	9- Chillicothe				x
	10- Marietta				x
	11- New Philadelphia				x
	12- Garfield Heights	x			
Totals	12	2	1	0	9
OKLAHOMA	1- Muskogee				x
	2- Antlers				x
	3- Ada				x
	4- Perry				x
	5- Clinton				x
	6- Buffalo				x
	7- Duncan				x
	8- Tulsa		x		
Totals	8	0	1	0	7
OREGON	1- Milwaukee	x			
	2- Salem		x		
	3- Roseburg				x
	4- Bend				x
	5- La Grand				x
Totals	5	1	1	0	3

STATE	DISTRICT OR DIVISION LOCATION	DIRECT EFFECTS AND FALLOUT	DIRECT EFFECTS	FALLOUT	NOT IN RISK AREA
PENNSYLVANIA	Franklin		x		
	Clearfield				x
	Montoursville				x
	Dunmore		x		
	Allentown		x		
	St. Davids			x	
	Harrisburg		x		
	Hollidaysburg		x		
	Indiana				x
	Pittsburg	x			
	Uniontown				x
Totals	11	1	5	1	4
RHODE ISLAND	Providence	x			
Totals	1	1	0	0	0
SOUTH CAROLINA	1- Columbia		x		
	2- Greenwood				x
	3- Greenville		x		
	4- Chester				x
	5- Florence				x
	6- Charleston Heights		x		
	7- Orangeburg				x
Totals	7	0	3	0	4
SOUTH DAKOTA	Aberdeen				x
	Huron				x
	Mitchell				x
	Pierre				x
	Rapid City		x		
Totals	5	0	1	0	4
TENNESSEE	I Knoxville		x		
	II Chattanooga		x		
	III Nashville		x		
	IV Jackson				x
Totals	4	0	3	0	1

STATE	DISTRICT OR DIVISION LOCATION	DIRECT EFFECTS AND FALLOUT	DIRECT EFFECTS	FALLOUT	NOT IN RISK AREA
TEXAS	1- Paris				x
	2- Fort Worth		x		
	3- Wichita Falls		x		
	4- Amarillo		x		
	5- Lubbock				x
	6- Odessa				x
	7- San Angelo		x		
	8- Abilene		x		
	9- Waco		x		
	10- Tyler		x		
	11- Lufkin				x
	12- Houston	x			
	13- Yoakum				x
	14- Austin		x		
	15- San Antonio		x		
	16- Corpus Christi		x		
	17- Bryan		x		
	18- Dallas		x		
	19- Atlanta				x
	20- Beaumont	x			
	21- Pharr		x		
	22- Del Rio		x		
	23- Brownwood				x
	24- El Paso		x		
	25- Childress				x
Totals	25	2	15	0	8
UTAH	1- Ogden		x		
	2- Salt Lake City		x		
	3- Richfield				x
	4- Price				x
	5- Cedar City				x
	6- Orem		x		
Totals	6	0	3	0	3

STATE	DISTRICT OR DIVISION LOCATION	DIRECT EFFECTS AND FALLOUT	DIRECT EFFECTS	FALLOUT	NOT IN RISK AREA
VERMONT	1- Bennington				x
	2- Brattleboro				x
	3- Rutland				x
	4- White River Junction				x
	5- Colchester		x		
	6- Berlin				x
	7- St. Johnsbury				x
	8- St. Albans				x
	9- Derby				x
Totals	9	0	1	0	8
VIRGINIA	Bristol		x		
	Salem		x		
	Lynchburg		x		
	Richmond		x		
	Suffolk		x		
	Fredericksburg				x
	Culpeper				x
	Staunton				x
Totals	8	0	5	0	3
WASHINGTON	1- Seattle		x		
	2- Wenatchee				x
	3- Tumwater				x
	4- Vancouver	x			
	5- Yakima				x
	6- Spokane		x		
Totals	6	1	2	0	3
WEST VIRGINIA	Charleston		x		
	Huntington		x		
	Parkersburg				x
	Clarksburg				x
	Keyser				x
	Moundsville				x
	Weston				x
	Elkins				x
	Lewisburg				x
	Princeton				x
Totals	10	0	2	0	8

STATE	DISTRICT OR DIVISION LOCATION	DIRECT EFFECTS AND FALLOUT	DIRECT EFFECTS	FALLOUT	NOT IN RISK AREA
WISCONSIN	Madison		x		
	Milwaukee		x		
	Waukesha		x		
	Green Bay		x		
	Wisconsin Rapids				x
	La Crosse		x		
	Eau Claire		x		
	Rhinelander				x
	Superior		x		
Totals	9	0	7	0	2
WYOMING	Laramie				x
	Casper		x		
	Rock Springs				x
	Sheridan				x
	Basin				x
Totals	5	0	1	0	4
US TOTALS:					
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EOC REQUIREMENTS AT STATE AND LOCAL LEVELS
Kent F. Paxton, Frederick Goshe, and Charles T. Rainey

Center for Planning and Research, Inc., Palo Alto, CA
August 1980, 131 pp. Contract DCPA01-77-C-0231
Work Unit 2614B

UNCLASSIFIED

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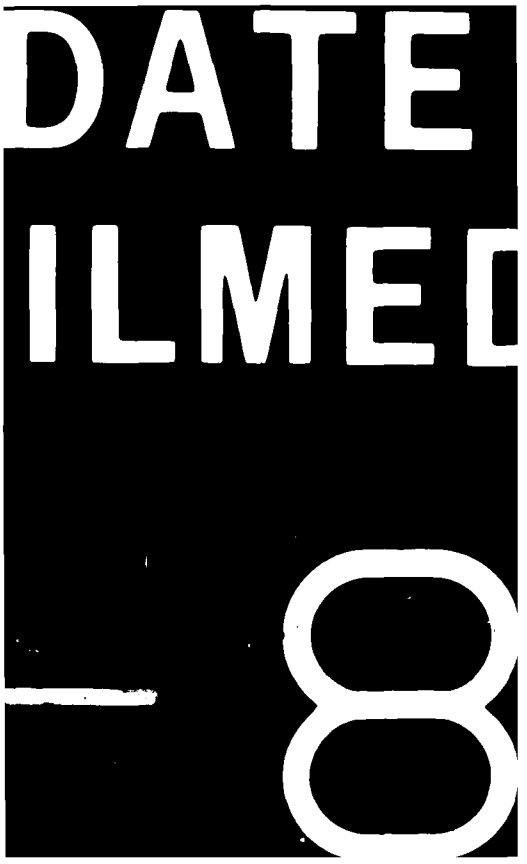
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